

THE COMPOSITAE OF NEW GUINEA III*)

JOSÉPHINE TH. KOSTER

Rijksherbarium, Leiden

4. INULEAE*)

Cass., J. Phys. Chim. Hist. Nat. 88 (1819) 193; Hoffmann, E. & P., Nat. Pfl. Fam. 4, 5 (1894) 172.

Herbs. *Leaves* nearly always alternate, sometimes rosulate, mostly entire, sometimes dentate, rarely pinnatifid. *Heads* solitary or in inflorescences, homogamous or heterogamous; phyllaries one- to many-seriate, herbaceous or membranous; corolla of marginal flowers filiform, dentate, or ligulate, of disc flowers tubular, (4- or) 5-dentate; anthers sagittate and mostly caudate at the base; style two-armed; achene small, pappus setaceous, sometimes consisting of scales, or wanting; receptacle naked.

KEY TO THE GENERA IN NEW GUINEA

- 1 a. Leaves decurrent along the stem; heads small, densely clustered into glomerules 2
- b. Leaves not decurrent along the stem; heads solitary, few together, corymbose, paniculate, or clustered, but not in glomerules 3
- 2 a. Pappus setaceous 1. *Pterocaulon*
- b. Pappus wanting 2. *Sphaeranthus*
- 3 a. Heads small, numerous, disc-shaped; pappus wanting 3. *Epaltes*
- b. Heads variously shaped; pappus setaceous 4
- 4 a. Heads large; involucre 18—25 mm long; phyllaries orange-yellow, afterwards yellow-brown, glossy. 4. *Helichrysum*
- b. Involucre much shorter than 18 mm; phyllaries variously coloured but not yellow 5
- 5 a. Heads solitary, homogamous; corolla tubular 5. *Phacellothrix*
- b. Heads solitary or several together, mostly heterogamous, when homogamous then corolla of marginal flowers filiform 6
- 6 a. Whitish lanate herbs; phyllaries rigid, membranous, more or less glossy, whitish or light brown 7
- b. Herbs not whitish lanate; phyllaries herbaceous or membranous, not whitish or light brown 8
- 7 a. Heads densely corymbose, shortly pedunculate; feminine marginal flowers often numerous, sometimes wanting; disc flowers often masculine, sometimes bisexual, 1—50; exclusively masculine heads frequent, number of marginal flowers and disc flowers in a head very variable in one and the same species. 6. *Anaphalis*
- b. Heads clustered or solitary, sessile or subsessile; feminine marginal flowers numerous; disc flowers bisexual, 1—7; exclusively masculine heads not occurring, number of marginal flowers and disc flowers in a head not much variable in one and the same species 7. *Gnaphalium*
- 8 a. Disc flowers few, masculine; style undivided or shortly two-armed, ovary rudimentary 8. *Pluchea*
- b. Disc flowers few or numerous, bisexual; style arms fairly long, ovary normally developed 9. *Blumea*

*) I in Nova Guinea, Bot. 24 (1966) 497—614 (numbering of tribes in accordance with this paper); II in *Blumea* 18 (1970) 137—145.

I. PTEROCAULON

Elliot, Sketch Bot. S.-Carol. and Geo. 2 (1823) 323; Benth., Fl. Austr. 3 (1866) 522; Benth. & Hook. f., Gen. Pl. 2 (1873) 294; Clarke, Comp. Ind. (1876) 98; Hook. f., Fl. Br. Ind. 3 (1881) 275; Hoffmann, E. & P., Nat. Pfl. Fam. 4, 5 (1894) 178; Koster in Backer & Bakh., Fl. Java 2 (1965) 391. — *Monenteles* Labill., Sert. Austro-caled. 2 (1825) 42.

Grey-tomentose herbs. *Leaves* alternate, decurrent along the stem. *Heads* small, densely clustered into globose, ellipsoid, or cylindrical glomerules, heterogamous; involucre ovoid or campanulate, phyllaries in few rows, narrow, inner gradually shorter, linear, rigidly scarious, deciduous together with flowers, outer much shorter. *Marginal flowers* several, female; corolla filiform, minutely 2- or 3-dentate or truncate; style-arms filiform, rather long, exserted; achene small, oblong, 4- or 5-costate, pappus setaceous, hairs white, fine, ciliate. *Disc flowers* few or one, bisexual, often sterile; corolla tubular, thin, 5-lobate; anthers sagittate and caudate at the base, obtuse at the apex, auricles very fine, connate; style-arms lanceolate, short; achene and pappus like those of marginal flowers; receptacle minute.

Distribution: about 30 species in N., C., and S. America, Burma, S. China, Malasia, Australia, New Caledonia.

KEY TO THE SPECIES IN NEW GUINEA

- 1 a. Leaves obovate-oblong, minutely dentate; glomerules of heads in terminal spikes 1. *P. redolens*
 b. Leaves oblong, repand or subentire; glomerules of heads solitary, terminal, sessile or on winged peduncles. 2. *P. sphacelatum*

1. *Pterocaulon redolens* (Forst. f. ex Willd.) F.-Vill., Noviss. App. Blanco, Fl. Filip., 3rd ed., 4, 3 (1880) 116; Mattfeld, Bot. Jahrb. 62 (1929) 426; Merr. & Chun, Sunyatsenia 2 (1935) 329; Craib in Kerr, Fl. Siam. 2 (1936) 268. — *Conyza redolens* Forst. f. ex Willd., Sp. Pl. 3 (1803) 1951. — *Monenteles spicatus* Labill., Sert. Austro-caled. 2 (1825) 43, t. 43; Benth. Fl. Austr. 3 (1866) 523. — *Pterocaulon cylindrostachyum* Clarke, Comp. Ind. (1876) 98; Hook. f., Fl. Br. Ind. 3 (1881) 275; Bailey, Weeds Pois. Pl. Qld (1906) f. 135; Gagnepain, Fl. Gén. I.-C. 3 (1924) 550, f. 57: 1-7. — *Pterocaulon spicatum* (Labill.) Domin, Bibl. Bot., Heft 89 (1929) 1218.

Erect herb, 30-100 cm tall, often much branched in the upper part, stem sparsely greyish lanate-tomentose, in the lower part glabrescent, 2-6 mm thick, wing entire, greyish lanate-tomentose, internodes 1-2 cm long. *Leaves* obovate-oblong, narrowed to the base, rounded or nearly so at the apex, minutely dentate, chartaceous, densely greyish lanate-tomentose below, thinly so above, 1-5.5 cm long, 0.5-2 cm broad. *Glomerules* of heads small, globose or ellipsoid-oblong, sessile, in terminal 2-7 cm long spikes; heads ellipsoid-oblong; involucre ovoid, 5 mm long, phyllaries 4-seriate, inner linear-lanceolate, acuminate and acute, rigid, stramineous, pale brownish, shining, glabrous, outer narrowly spathulate, obtuse or rounded, densely dingy crisp-lanate. *Marginal flowers* 20-25; corolla 2- or 3-dentate, 3 mm long; achene dark brown, 0.75 mm long, sparsely shortly pilose, pappus 2.5 mm long. *Disc flower* one; corolla 3 mm long, lobes deltoid-ovate, glandular at the upper part; achene 0.5 mm long, empty, pappus 2.5 mm long.

Distribution: Burma, Thailand, Laos, Vietnam, Malay Peninsula, Philippines, New Guinea, Australia, New Caledonia, New Hebrides.

NEW GUINEA. East. Milne Bay Dist.: Uga, 1949, *Cruetwell* 173 (K). — Central Dist.: Kapa to Kaili, 1889, *MacGregor s.n.* (MEL); Port Moresby, s.d., *Goldie s.n.* (MEL); E. footslopes Tovobada Hills, 12 m. N. of Port Moresby, 1965, *Heyligers* 1229 (L); Port Moresby Subdist., Tupuseleia, 1967, *Kairo & Streimann NGF 30803* (L); Hisiu, 1935, *Carr* 11451 (A, BM, L, NY). — Morobe Dist.: Kajabit, 1939, *Clemens* 10519 (A); Markham valley, Erap near Lea, 1958, *Henty NGF 9841* (BO, BRI, L, LAE), 1959, 10684 (LAE).

Collectors' annotations: aromatic, malodorous; leaves dull green above, grey green below; corolla faint pink, white, white tinged pale mauve, or red and white.

Ecological notes: roadside weed; in open grassland; in open savannah land; in strand vegetation; on bare patch of ground with plenty of humus; in woodland. Altitude: 0–300 m.

2. *Pterocaulon sphacelatum* (Labill.) F. v. M., *Syst. Census Austr. Pl.* 1 (1882) 79; Bailey, *Queensl. Fl.* 3 (1900) 824; Britten, *Ill. Austr. Pl. Banks and Sol.* 2 (1901) 49 t. 156; Domin, *Bibl. Bot. Heft* 89 (1929) 1218; Koster, *Fedde Repert.* 34 (1933) 14; in Backer & Bakh., *Fl. Java* 2 (1965) 392. — *Monenteles sphacelatus* Labill., *Sert. Austro-caled.* 2 (1825) 43, t. 44; Benth., *Fl. Austr.* 3 (1866) 523; Benth. & Hook. f., *Gen. Pl.* 2 (1873) 295.

Herbs 25–60 cm tall, upper part branched, stem 2–6 mm thick, together with entire wing densely lanate-tomentose, hairs long, crispy, hyaline, inflated at the base; internodes 1–3 cm long. *Leaves* oblong, rounded and apiculate at the apex, repand or subentire, chartaceous, thinly greyish more or less crispy-tomentose above, densely so below, 1–4.5 cm long, 0.5–2 cm broad, higher ones smaller. *Glomerules* of heads globose or ellipsoid, 1–1.5 cm wide, terminal, sessile or on 0.5–1.5 cm long winged peduncles; heads ellipsoid-oblong, involucre ovoid, 4 mm long, phyllaries 4-seriate, inner linear-lanceolate, acuminate and acute, rigid, whitish stramineous, shining, glabrous, outer narrowly spatulate, obtuse or rounded, densely white crispy-lanate. *Marginal flowers* 10–20; corolla finely 2- or 3-dentate, purplish, 3 mm long; achene pilose, 1 mm long, pappus 3 mm long. *Disc flower* one; corolla 3.5 mm long, lobes deltoid-ovate, glandular at the upper part; achene 0.75 mm long, empty, pappus 3 mm long.

Distribution: SE. Malaysia (Kangean I., Buton I., Lesser Sunda Is, New Guinea), Australia, New Caledonia.

NEW GUINEA. East. Milne Bay Dist.: Milne Bay, 1889, *MacGregor s.n.* (MEL). — Central Dist.: Kairuhu Subdist., Rogers Airstrip, 8 m. W. of Kanosia Plantation, 1962, *Darbyshire* 647 (L); island off Red Scar Point, 1849, *MacGillivray* 473 (K); Fisherman I., 1880, *Chalmers s.n.* (MEL).

Collectors' annotations: erect herb up to 90 cm tall; corolla faintly purple.

Ecological notes: open savannah. Altitude: 9 m.

2. SPHAERANTHUS

L., *Sp. Pl.* (1753) 927; Lessing, *Syn. Gen. Comp.* (1832) 201; Benth. & Hook. f., *Gen. Pl.* 2 (1873) 294; Clarke, *Comp. Ind.* (1876) 96; Hook. f., *Fl. Br. Ind.* 3 (1881) 274; Hoffmann, E. & P., *Nat. Pfl. Fam.* 4, 5 (1894) 178; Robijns, *Kew Bull.* (1924) 177; Ross-Craig, Hook. *lc. Pl. V*, 6 (1954) 1; Koster in Backer & Bakh., *Fl. Java* 2 (1965) 391.

Herbs. *Leaves* alternate, nearly always decurrent along the stem. *Heads* minute, densely clustered in terminal or axillary, nearly always pedunculate, globular or ovoid glomerules, heterogamous; involucre narrowly campanulate, phyllaries about equal in length. *Marginal flowers* many, female; corolla tubular, minutely 3-dentate, more or less swollen, subcartilaginous; style shortly bifid; achene oblong, pappus wanting. *Disc flowers* one or few, bisexual or male; corolla tubular-campanulate, 5-lobed, subcartilaginous; anthers

sagittate or subcaudate, with acute basal auricles, obtuse at the apex; style undivided or minutely bifid, papillose; achene oblong, pappus wanting; receptacle small, naked, variable in shape.

Distribution: 37 species in Iraq, Iran, tropical Asia, Africa, Australia.

1. *Sphaeranthus africanus* L., Sp. Pl. ed. 2 (1763) 1314; Hook. f., Fl. Br. Ind. 3 (1881) 275; Valetton, Bull. Dép. Agr. Ind. Néerl. 10 (1907) 69; Robijns, Kew Bull. (1924) 196; Gagnepain, Fl. Gén. I.-C. 3 (1924) 566, f. 60: 8—17; Mattfeld, Bot. Jahrb. 62 (1929) 426; Craib in Kerr, Fl. Siam. 2, 3 (1936) 267; Ross-Craig, Hook. Ic. Pl. V, 6 (1954) 18, t. 3501 A; Koster in Backer & Bakh., Fl. Java 2 (1965) 391.

Erect herb, often much branched, 25—50 cm tall or taller, stem winged, 3—5 mm thick, sparsely pilose, wing entire or nearly so, branches often spreading. *Leaves* decurrent along the stem, oblanceolate-elliptic, oblanceolate, or oblong-lanceolate, acutely mucronate, subentire or minutely repand-denticulate, sparsely crispy pilose at both sides, 1.5—7 cm long, 0.3—1.8 cm broad. *Glomerules* pedunculate, globose or subglobose, 6—9 mm wide, with a few obovate-lanceolate, acute and acuminate, shortly pilose, glandular bracts at the base, peduncles mostly winged, 0.5—2.5 cm long; heads numerous, phyllaries about 7 or more, oblong-spathulate or obovate-oblong, apiculate, faintly undulate at the upper part, sometimes navicular, for the greater part scarious, glabrous, sometimes glandular at the upper part, 2—3 mm long. *Marginal flowers*: corolla obovoid or ovoid-cylindrical, subcartilaginous in the lower part, abruptly narrowed into the short conical-cylindrical upper part, glabrous, 1—1.5 mm long; style-arms obtuse, short; achene oblong, somewhat angular, shortly pilose and glandular, 0.75—1 mm long, on a short stipe, often stipe-like and empty. *Disc flowers*: corolla somewhat laterally compressed, glabrous, 1.5 mm long, longer lower part subcartilaginous, shorter upper part slightly narrowed, lobes deltoid, subacute; style exserted, very shortly bifid; achene 1 mm long, glandular, on a short stipe, often stipe-like and empty; receptacle shortly obconical.

Distribution: Africa, Madagascar, India, Ceylon, Burma, Thailand, Vietnam, China, Malesia, Australia.

NEW GUINEA. East. Western Dist.: Saibai I., 1885, Stewart s.n. (MEL). — West. Merauke, 1904, Koch s.n. (BO, L), 1954, McKee 1671 (L, LAE); S. and SW. New Guinea, Zippelius s.n. (L).

Collectors' annotation: more or less prostrate.

Ecological note: weed in rice field.

3. EPALTES

Cassini, Bull. Sc. Soc. Philom. Paris (1818) 139; Dict. Sc. Nat. 15 (1819) 6; Lessing, Linnaea 5 (1830) 147; Syn. Gen. Comp. (1832) 206; Benth., Fl. Austr. 3 (1866) 529; Benth. & Hook. f., Gen. Pl. 2 (1873) 293; Clarke, Comp. Ind. (1876) 96; Hook. f., Fl. Br. Ind. 3 (1881) 274; Hoffmann in E. & P., Nat. Pfl. Fam. 4, 5 (1894) 178; Bailey, Queensl. Fl. 3 (1900) 821; Burbidge, Dict. Austr. Pl. Gen. (1963) 113.

Herbs. *Leaves* alternate. *Heads* small, disc-shaped, heterogamous; involucre ovoid, campanulate, or basin-shaped, phyllaries imbricate. *Marginal flowers* numerous, many-seriate, female; corolla filiform-tubular, 2- or 3-dentate; style-arms thin, obtuse; achene ribbed, pappus wanting. *Disc flowers* few, bisexual, often sterile; corolla tubular, limb somewhat broadened or campanulate, 3—5-dentate; anthers sagittate and caudate at the base, with connate acuminate basal auricles and with an obtuse apical appendage; style

undivided, subulate, or with two short obtuse branches, papillose at the upper part; achene ribbed, often abortive, pappus wanting or consisting of 2 or 3 deciduous bristles; receptacle flat or concave in the centre, naked, alveolate.

Distribution: 17 species in tropical Africa, Madagascar, Asia, Australia, New Caledonia, Mexico, Cuba, Brasil.

I. *Epaltes australis* Less., *Linnaea* 5 (1830) 148; Benth., *Fl. Austr.* 3 (1866) 530; Bailey, *Queensl. Fl.* 3 (1900) 822; Banks & Solander, *Ill. Bot. Cook Voy. Austr. Pl.* 2 (1901) pl. 158; Bailey, *Weeds. Pois. Pl. Queensl.* (1906) f. 134; Merrill, *Enum. Phil. Pl.* 3 (1923) 607; Ridley, *Fl. Mal. Pen.* 2 (1923) 195; Domin, *Bibl. Bot. Heft* 89 (1929) 1217; Craib in Kerr, *Fl. Siam.* 2, 3 (1936) 267.

Prostrate or nearly so, diffuse herb, 5–24 cm tall, much branched, stem 1–3 mm thick, sparsely crispy-pilose, internodes 0.5–1.5 cm long. *Leaves* sessile, spatulate, attenuate to the truncate or faintly auriculate base, rounded at apex, shortly dentate except for the entire lower part, chartaceous, minutely glandular and more or less crispy sparsely pilose (hairs many-celled) on both surfaces, 1.5–5 cm long, 0.3–1.5 cm broad. *Heads* in or somewhat below the axils of the upper leaves, 1–3 together, sessile or shortly pedunculate, 4–6 mm wide; involucre basin-shaped, 3–4 mm long, phyllaries 3-seriate, scarious, obovate-oblong, glossy, outer rounded, inner nearly so and mucronulate at the apex. *Marginal flowers*: corolla 0.75 mm long; achene oblong, glandular, 0.75 mm long. *Disc flowers*: corolla 1 mm long, limb campanulate, 4- or 5-dentate, tube short; achene like that of marginal flowers but often abortive.

Distribution: India, Thailand, Indo-China, S. China, Japan, Malay Pen., Philippines, New Guinea, Australia, New Caledonia, Loyalty Is.

NEW GUINEA. **E a s t.** Milne Bay Dist.: Sudest I., Joe Landing, 1956, *Brass* 27780 (A, L, LAE); Sudest I., 1965, *Henty NGF* 27103 (L, LAE); Misima I., Narian, 1956, *Brass* 27606 (A, L). — **Western Dist.:** Daru I., 1963, *Womersley NGF* 17786 (L); Arufi, Wassi Kussa R., 1968, *Henty & Katik NGF* 38641 (L).

Collectors' annotations: aromatic; somewhat fleshy; corolla red, reddish, or brownish; style-arms red.

Ecological notes: muddy ground on edge of mangrove swamp; low coral-limestone foreshores, foreshore among short grass; river bank and edge of dug drain in savannah. Altitude: sea level.

4. *HELICHRYSUM*

P. Miller, *Gard. Dict. Abr. ed.* 4 (1754) (*Elichrysum*); corr. Persoon, *Syn. Pl.* 2 (1807) 414, *nom. cons.*; Lessing, *Syn. Gen. Comp.* (1832) 274; Benth., *Fl. Austr.* 3 (1866) 612; Benth. & Hook. f., *Gen. Pl.* 2 (1876) 309; Hoffmann, E. & P., *Nat. Pfl. Fam.* 4, 5 (1894) 190; Robertson in Black, *Fl. S. Austr.* 4 (1957) 907; Burbidge, *Dict. Austr. Pl. Gen.* (1963) 146.

Shrubs, undershrubs or herbs. *Leaves* alternate or lower ones rarely opposite, entire. *Heads* solitary or corymbose, small or large, heterogamous or homogamous; involucre various in shape, phyllaries many-seriate, imbricate, outer gradually shorter, scarious, rigid, white or variously coloured, inner often so only in the longest upper part. *Marginal flowers* few or wanting, female; corolla tubular, slender, 2- or 3-dentate; style-arms truncate; achene small, cylindrical, 5-angular or slightly compressed or terete, pappus setaceous, setae hairlike, very fine or rarely wanting. *Disc flowers* few to numerous, bisexual; corolla tubular, 5- or rarely 4-lobed; anthers sagittate-caudate, auricles very fine; style-arms truncate or sometimes with conical apex; achene and pappus like those of

marginal flowers; receptacle various in shape, usually naked, rarely some scales occurring among the innermost flowers, alveolate.

Distribution: a large number of species in Europe, Africa, Asia, Australia.

1. *Helichrysum bracteatum* (Vent.) Andrews, Bot. Repos. 6 (1805) sub t. 428; Benth., Fl. Austr. 3 (1866) 620; Domin, Bibl. Bot. Heft 89 (1929) 1222; Robertson in Black, Fl. S. Austr. 4 (1957) 910, f. 1209. — *Xeranthemum bracteatum* Vent., Jard. Malm. (1803) t. 2; Andrews, o.c. 6 (1804) t. 375.

Erect perennial herbs, 25–80 cm tall, often much branched, stem 2–5 mm thick, thinly whitish arachnoid-lanate, glandular, internodes 1–4 cm. *Leaves* sessile, variable in shape, linear-lanceolate, (ob)lanceolate, or elliptic-oblong, chartaceous, truncate, somewhat rounded or slightly auriculate at the base, acute and finely acuminate or mucronate at the apex, thinly whitish arachnoid-lanate and densely covered with minute gland hairs at both sides, 3–14 cm long, 0.2–2.5 cm broad, midrib prominent below, lowest leaves in young plants crowded at the base, subrosulate. *Heads* terminal and in the axils of the upper leaves, large, on gradually attenuate, whitish lanate, 7–19 cm long peduncles bearing some small leaflike bracts; involucre hemispheric-campanulate, 18–25 mm long, phyllaries glossy, orange-yellow, afterwards yellow-brown, outer broadly ovate, mucronate, inner ovate-oblong, lanceolate-oblong to lanceolate, shortly acuminate, with a fairly short stramineous basal part fringed at the margin. *Marginal flowers* few; corolla filiform-tubular, swollen at the base, 5 mm long; style-arms somewhat flattened, canaliculate, truncate; achene cylindrical, 5-angular, glabrous, 2 mm long, pappus 8 mm long, setae cohering at the base, orange, ciliate. *Disc flowers* very numerous; corolla 8 mm long, tube long, limb narrowly campanulate, lobes fairly long, acute; style-arms somewhat flattened, canaliculate, with papillose conical apex; achene and pappus like those of marginal flowers; receptacle large, flat, naked.

Distribution: New Guinea, Australia, Tasmania, Cook Is.

NEW GUINEA. East. Morobe Dist.: Mumeng Subdist., Mapos, 1968, *Streimann & Kairo* NGF 35825 (L); Wau Subdist., between Kaisenik and Wuri-Wuri, 1968, *Streimann & Kairo* NGF 39130 (L); Menyamya, 1968, *Streimann & Kairo* NGF 35872 (L). — E. Highl. Dist.: base of Kratke Mts, 12 m. S. of Aiyura, 1963, *Hartley* 12159 (L); ibidem, Obura, 1959, *Brass & Collins* 32176 (NA); NE. slopes of Mt Michael, Lufa-Goroka Rd, 1959, *Womersley* NGF 11737 (BRJ, LAE); Wonenara Patrol Post, above Guaiga R., Kainantu Subdist., 1963, *Henty & Carlquist* NGF 16517 (L); Henganofi, 1967, *Streimann* NGF 35697 (L); Lower Benabena R., 1957, *Robbins* 854 (CANB, L, LAE); Goroka, Town Area, 1954, *Womersley et al.* NGF 6178 (A, BM, BO, CANB, L, LAE); ibidem, J. Leahey's Logging area, 1954, *Womersley & Floyd* NGF 6151 (A, BM, BRJ); Upper Asaro R., near Miruma, scattered, 1956, *Hoogland & Pullen* 5410 (BM, CANB, L); Marafunga, c. 20 m. NW. of Goroka, 1964, *Hartley* 13237 (L). — W. Highl. Dist.: Tomba, 1957, *Saunders* 660 (BM, CANB, L, LAE); N. slopes Sugarloaf complex, along Wapu R., common, 1960, *Hoogland & Schodde* 7075 (L); Wabag-Laiagam Rd, near Lake Iviva, 1962, *Womersley* NGF 15288 (L); Ambum-Mari-muni Divide, upper Ambum valley, 1960, *Robbins* 3098 (CANB); 4 m. NW. of Laiagam, frequent, 1965, *Flemley* ANU 2522 (CANB, L); near Kepilam, Lagaip valley, 1960, *Hoogland & Schodde* 7379 (L); Sirunki, 1962, *Walker* ANU 384 (L). — S. Highl. Dist.: pass between Mt Ne and Mt Kerewa, 1966, *Kalkman* 4839 (L). — Western Dist.: Oriomo R., Wuroi, not common, 1934, *Brass* 5704 (BM, BO, L, NY, these specimens have smaller heads on thin peduncles).

Collectors' annotations: spreading herb up to 2 m; leaves dull green above, (grey-) green below; corolla of marginal flowers yellow, of disc flowers (bright, deep, golden, orange, reddish) yellow, orange, or yellow and red. *Uses:* heads worn by Huli-men (S. Highlands) in their wigs.

Ecological notes: (secondary, dry, treefern-, savannah-) grasslands; on tussocks of sedges and low shrubs and ferns in swamps; native garden; on organic mud, on red

clays, on limestone; according to local natives greatly reduced in numbers since the practice of burning grasslands has been abandoned. Altitude: 1400—4000 m, also 10—30 m (Oriomo R., Wuroi).

5. PHACELLOTHRIX

F. v. M., *Fragm. Phyt. Austr.* 11 (89) (1878) 49; Bailey, *Queensl. Fl.* 3 (1900) 845; Hoffmann, E. & P., *Nat. Pfl. Fam.* 4, 5 (1894) 190; Burbidge, *Dict. Austr. Pl. Gen.* (1963) 227.

Herbs. *Leaves* alternate. *Heads* solitary, terminal, homogamous, many-flowered; involucre basin-shaped, phyllaries 3- or 4-seriate, scarious, with pellucid margins, outer gradually shorter. *Corolla* tubular, 5-lobed; anthers sagittate at the base, without basal appendages, with a lanceolate subacute apical appendage; style-arms lanceolate-subulate, papillose; achene oblong, pappus setaceous, hairs uni-seriate, 2—4 connate at the lower part, scabrid; receptacle naked.

Distribution: one species in Malesia and Australia.

1. *Phacellothrix cladochaeta* (F. v. M.) F. v. M., *Fragm. Phyt. Austr.* 11 (89) (1878) 49; Bailey, *Queensl. Fl.* 3 (1900) 845. — *Helichrysum cladochaetum* F. v. M., *Fragm. Phyt. Austr.* 5 (40) (1866) 199. — *Rutidosia brownii* Benth., *Fl. Austr.* 3 (1866) 594 (syn. acc. to Bailey, l.c.).

Erect delicate annual herb, simple or branched, 20—55 cm tall, stem more or less rigid, 1—1.5 mm thick, somewhat grooved, white-lanuginose, internodes 2.5—3 cm long, branches elongate. *Leaves* sessile, linear-lanceolate, oblanceolate, or narrowly spatulate, acutely mucronate at the apex, gradually attenuate to the base, adnate at the lower part, entire, membranaceous, thinly white-lanuginose or subglabrous above, densely white-lanuginose below, 1.5—3.5 cm long, 0.2—0.7 cm broad. *Heads* hemispherical, on elongate, filiform, white-lanate, 7—17 cm long peduncles, without bracts or with one minute linear bract; involucre 4—5 mm long, phyllaries lanceolate-subulate, glabrous, minutely glandular, one-nerved. *Flowers* bisexual; corolla 3 mm long, lobes lanceolate, acute; achene brown, glandular, glutinose, 1.5 mm long, usually fertile, pappus 2 mm long, dirty white; receptacle flat, tuberculate.

Distribution: Malesia (Aru Is and southern New Guinea) and northern Australia.

NEW GUINEA. *East*. Western Dist.: Fly R., Gaima, common, 1936, *Brass* 8269 (A, BM, BO, I, LAE); Oriomo R., Wuroi, scattered, common, 1934, *Brass* 5738 (BO, GH, NY). — *West*. Merauke Subdist.: Koerik, Noordpolder, not abundant, 1962, *Hoogerwerf* 240 (L); ibidem, bank of Koembe R., relatively abundant, 1954, *van Royen* 4853 (L).

Collectors' annotation: corolla yellow.

Ecological notes: in short to long grass of savannahs; on hard soil. Altitude: 3—10 m.

6. ANAPHALIS

DC., *Prodr.* 6 (1837) 271; Benth. & Hook. f., *Gen. Pl.* 2 (1876) 303; Clarke, *Comp. Ind.* (1876) 101; Hook. f., *Fl. Br. Ind.* 3 (1881) 279; Hoffmann, E. & P., *Nat. Pfl. Fam.* 4, 5 (1894) 186; Boerlage, *Handl. Fl. Ned. Ind.* 2 (1899) 192; Gagnepain, *Fl. Gén. I.-C.* 3 (1924) 553; Koster in Backer & Bakh., *Fl. Java* 2 (1965) 392.

Perennial herbs, shrubs, or small trees, whitish lanate. *Leaves* alternate, sessile, one-nerved, entire. *Heads* in terminal and axillary dense corymbs, often combined into corymbiform compound inflorescences, shortly peduncled, many-flowered, heterogamous or

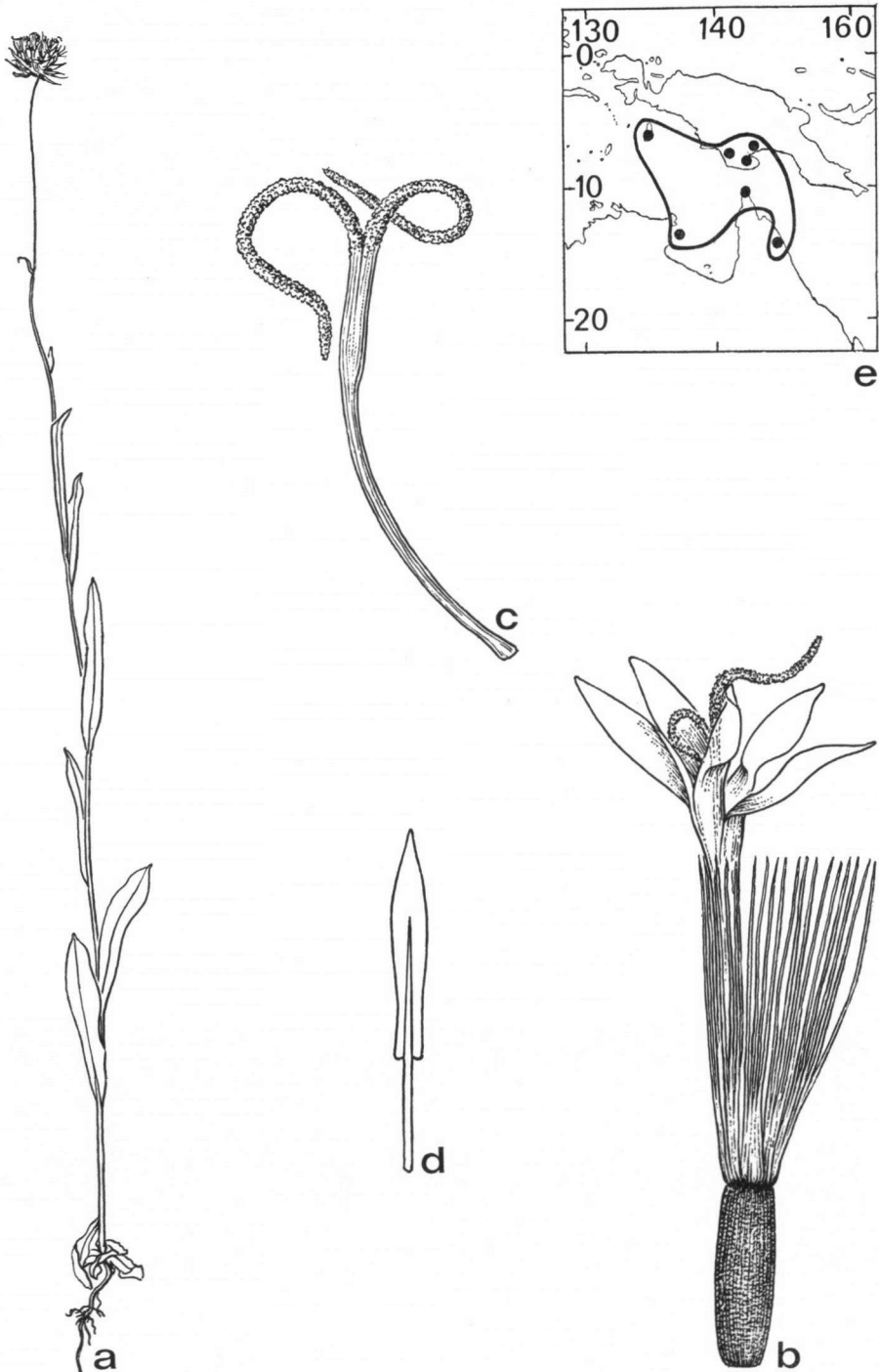


Fig. 1. *Phacellothrix cladochaeta*. — a. Habit, $\times \frac{1}{2}$; b. flower, $\times 45$; c. style, $\times 45$; d. anther, $\times 45$; e. distribution. — (a—d: Brass 8269).

homogamous; involucre campanulate, expanded at an advanced age, phyllaries imbricate, 4- or 5-seriate, rigid, membranous with a hard lower part, mostly glabrous, more or less glossy, whitish, outer gradually shorter. *Marginal flowers* many-seriate or wanting, female. *Disc flowers* 1—50, bisexual or masculine, proportion of the number of female flowers to that of bisexual or masculine ones variable in one and the same species. *Corolla* whitish or light yellow, in the marginal flowers filiform, with a 3- or 4-(sometimes 5-) dentate top, in the disc flowers tubular, with a widened 5-lobed top, minutely glandular; anthers sagittate at the base, on both sides with a filiform basal appendage; style-arms short in female and masculine flowers; achenes more or less oval, more or less 3-angular, somewhat compressed, brown, minutely glandular, in masculine flowers empty; pappus hairs one-seriate, dentate, dingy-white, in disc flowers more or less distinctly clavate; receptacle conical or flat, naked, alveolate.

Distribution: about 100 species, most in Asia, several in N. and S. America; temperate and montane plants.

KEY TO THE SPECIES IN NEW GUINEA

- 1 a. Leaves very small, 0.4—1.0 cm long, 0.2—0.25 cm broad; heads solitary, terminal; phyllaries very acute. 1. *A. papuana*
- b. Leaves 0.5—8 cm long, 0.2—1.3 cm broad; heads (sometimes few) in terminal corymbs; phyllaries acute, subacute or obtuse 2
- 2 a. Leaves very dense in the lower part of the stem, small, 0.5—2.7 cm long, 0.2—0.4 cm broad; heads 3—21 together, in thin corymbs; involucre 7—10 mm long 2. *A. mariae*
- b. Leaves 2—8 cm long, 0.2—1.3 cm broad; heads numerous, in dense corymbs; involucre 5—6 mm long 3
- 3 a. Leaves lanceolate, densely lanate above; phyllaries ovate to oblong, obtuse or subacute, stramineous 3. *A. lorentzii*
- b. Leaves linear-lanceolate, glabrous or nearly so above; phyllaries oblong-lanceolate, acuminate, acute, membranous 4. *A. arfakensis*

1. *Anaphalis papuana* (Lauterbach) Koster *nov. comb. et stat.* — *Anaphalis* ? *nubigena* DC. var. *papuana* Lauterbach, Nova Guinea 8 (1914) 864. — *Anaphalis monocephala* S. Moore, Trans. Linn. Soc., Bot. 9 (1916) 85, *nom. illeg., non* DC., Prodr. 6 (1837) 18; Mattfeld, Nova Guinea 14 Bot. (1928) 525; Bot. Jahrb. 62 (1929) 427; van Steenis, Bull. Jard. Bot. Btzg III, 13 (1934) 185.

Small shrubs, 20—35 cm tall, often much branched, stems terete, slender, 1—2 mm thick, white lanate, partly procumbent; internodes 2—5 mm long. *Leaves* very dense in the lower part of the stems, less dense in the upper part, oblong- or obovate-lanceolate, with revolute margins, densely white lanate on both sides except for the glabrous acute top, basal part appressed to the stem, herbaceous, 0.4—1 cm long, 0.2—0.25 cm broad. *Heads* terminal, solitary; involucre 10—14 mm long, phyllaries 5-seriate, numerous, stramineous, shining, dingy-white, lanceolate, rarely bidentate at the top, very acute, glabrous except whitish lanate outer ones. *Marginal flowers* numerous, 4 mm long; corolla 3 mm long, 5-dentate at the apex; style-arms fairly broad, papillose at the top; achene 1 mm long, oblong, pappus hairs dingy-white, 4 mm long, very acute. *Disc flowers* 4 mm long; corolla campanulate-infundibuliform, 3 mm long; style-arms somewhat broadened, rounded and papillose at the top; anthers caudate at the base; achene and pappus as in marginal flowers; receptacle flat.

Distribution: New Guinea.

NEW GUINEA. West. Mt. Wilhelmina, Wilhelmina-top, 1909, Lorentz 1345 (BO, L, type); *cod.*, N. slopes, plentiful, 1938, Brass & Meyer-Drees 10048 (L); *cod.*, 7 km NE. of Wilhelmina-top, 1938, Brass &

Meyer-Drees 10017 (A, L); eod., 2 km E. of Wilhelmina-top, near waterfall, 1938, *Brass & Meyer-Drees 10348* (A, L); eod., Quarles valley, *Versteeg 2509* (BO, L), *2512* (L). Mt Carstensz, Dajakweide and surroundings, *Wissel 75* (BO); Mt Carstensz, 1913, *Kloss 14* (K).

Collectors' annotations: corolla of marginal flowers white, of disc flowers yellow.

Ecological notes: in alpine grassland; on wet limestone, among rocks and loose earth of screes, in dry places under rocks. Altitude: 3560—4500 m.

Remark: This species differs from the resembling *A. nubigena* DC. by the dense lower leaves and the stramineous phyllaries. In *A. nubigena* the leaves are distant, larger and broader; the phyllaries are white.

2. *Anaphalis mariae* F. v. M., Trans. R. Soc. Vict. 1, 2 (1889) 8; Boerlage, Handl. Fl. Ned. Ind. 2 (1891) 240; S. Moore, Trans. Linn. Soc., Bot. 9 (1916) 85; Mattfeld, Bot. Jahrb. 62 (1929) 428; van Steenis, Bull. Jard. Bot. Btzg III, 13 (1934) 185. — *Anaphalis nouhuysii* Lauterbach, Nova Guinea 8 (1912) 865; Mattfeld, l.c.; van Steenis, l.c. — *Anaphalis ?mariae* F. v. M. var. *lanuginosa* Lauterbach, l.c.

Small shrubs, simple or (often much) branched, 12—75 cm tall, stems partly procumbent, ascending, partly erect, white lanate, glabrescent, slender, terete, 1—3 mm thick, internodes 1—10 mm long. *Leaves* very dense in the lower part of the stems, often less dense in the upper part, afterwards recurved, linear-elliptic or linear-oblongate, mucronate and acute at the top, with involute margins, chartaceous, more or less white lanate or glabrous above, densely white lanate below, 0.5—2.7 cm long, 0.2—0.4 cm broad, lower ones smaller. *Heads* 3—21 together (only 1 or 2, as mentioned by F. v. M. in his diagnosis, was not found, neither in the type and the isotypes, nor in other specimens), in thin terminal corymbs, peduncles 0.5—2.5 cm long; involucre 7—10 mm long, phyllaries 4- or 5-seriate, chartaceous, shining, white or dingy-white except for the brownish basal part, lanceolate, obtuse or acute, often with some short teeth at the top, glabrous. *Marginal flowers* many; corolla 2.5 mm long, papillose at the top; style-arms truncate, finely papillose; achene turbinate-oblong, hirsute, 0.5 mm long, pappus 3 mm long. *Disc flowers* many; corolla 3 mm long; style-arms truncate and papillose at the top; anthers caudate at the base, obtuse at the top; achene oblong, sparsely hirsute, 0.5 mm long, pappus 3 mm long; receptacle conical, afterwards flat.

Distribution: New Guinea.

Collectors' annotations: lax, bushy, straggling, sprawling, (semi-) woody, shrubby herb, up to 1.2 m; solitary or forming large loose clumps or small colonies, gregarious; leaves shining (dark) green above; corolla of marginal flowers white or cream, of disc flowers pale green to yellow, light brown, ochre.

Ecological notes: montane to alpine grasslands, forest borders, (mossy) forests, rocky slopes; on fine loam, limestone, basalt, granite. Altitude: 2550—4400 m.

a. forma *mariae* — *Anaphalis nouhuysii* Laut.

Upper side of leaves glabrous or rarely with white lanate midrib.

NEW GUINEA. East. Milne Bay Dist.: Mt Aniata, 1959, *Cruttwell 1075* (K), 1962, *1302* (L). — Northern Dist.: Mt Scratchley, 1897, *Giulianetti & English s.n.* (K). — Central Dist.: Mt Knudsford, 1889, *MacGregor s.n.* (MEL, type; BRI, K); Mt Albert Edward, common, 1933, *Brass 4370* (BO, BRI, GH); Gailala, trail to Mt A. Edward, 1969, *Foreman & Wardle NGF 45526* (L). — Morobe Dist.: Rawlinson R., 1941, *Clemens 41942* (A); Salawaket R., Monarauwe, 1964, *Hoogland 9733* (L); ibidem, Upper Zaran Creek, SW. slopes Mt Enggom, 1963, *van Royen NGF 16172* (L). — E. Highl. Dist.: Mt Wilhelm, 1953—1968,

van Balgooy 617 (L), *Barrett* 1 (BRI, LAE), *Borgmann* 17a (L), *Brass* 29922 (CANB, L), 30051 (CANB, L, NY), 30510 (CANB, L), *McVean & Wade* ANU 7009 (L), *Millar* NGF 14652 (CANB, L), *Millar & Sayers* NGF 23784 (L), *Philpson* 3441 (L), *van Royen* NGF 15116 (CANB, L), 15161 (L), *Semple & Rayner* s.n. (MEL), *Vandenberg* NGF 35033 (L), *Womersley* NGF 8840 (CANB, L, LAE); Keglsugl, 1966, *Streimann & Kairo* NGF 27715 (L); Mt Otto, S. slopes, 1959, *Brass* 30988 (CANB, L, NY); Mt Piora, 1963, *Henty & Carlquist* NGF 16584 (CANB, L); Mt Michael, 1959, *Brass & Collins* 31238 (CANB, L, NY), *Brass* 31416 (L), 31417 (CANB, L, NY); Mt Ormogadzin, W. of Mt O Dan, 1963, *van Royen* NGF 18357 (L). — W. Highl. Dist.: Wahgi Divide area, 1953, *Womersley* NGF 5190 (LAE); Mt Hagen, S. slopes, 1957, *Robbins* 297 (CANB, L, LAE). — S. Highl. Dist.: Mt Giluwe, W. summit, 1961, *Schodde* 1719 (L), 1719a (CANB), 1959 (L); Mt Ambua, common, 1966, *Kalkman* 4977 (L); Ibiwara, Tari Gap, 1966, *Gillison* NGF 25167 (L); Mt Kerewa, locally common, 1966, *Vink* 17053 (L). — Madang Dist.: Finisterre Ra., S. upper slopes above Lake Naho basin, SSW. of Mt Abilala, 1964, *Pullen* 6087 (L). — West. Mt Wilhelmina, valley on N. part of summit, 1909, *van Nouhuys* 25a (U), 29 (U, type of *Anaphalis nouhuysii* Laut.); ibidem, 2 km E. of summit, plentiful, 1938, *Brass & Meyer-Drees* 10117 (A, L); 9 km NE. of Lake Habbema, 1938, *Brass* 10699 (A, L); Oranje Ra., 1913, *Versteeg* 2506 (GH, L); Utakwa R. to Mt Carstensz, 1913, *Kloss* s.n. (BM); Mt Carstensz, 1913, *Kloss* s.n. (K), 1936, *Wissel* 83, 162 (BO).

b. forma alba Koster nova forma — *Anaphalis ?mariae* F. v. M. var. *lanuginosa* Laut.

Folia utrinque albide lanata.

Type: *van Nouhuys* 27 (U).

NEW GUINEA. East. Northern Dist.: Mt Scratchley, 1896, *Giulianetti* s.n. (K, MEL). — Central Dist.: Mt Albert Edward, common, 1933, *Brass* 4248 (BO, BRI, GH), 4290 (BRI, GH), 4370 (BO, BRI, GH); Murray Pass, Wharton Ra., 1933, *Brass* 4643 (BO, BRI, GH, L), 1968, *Ridsdale* NGF 36858 (L). — Morobe Dist.: Rawlinson Ra., 1940, *Clemens* 41381 (A, L); Salawaket Ra., 1963, *Hartley* 11, 244 (L); ibidem, Ulap Trail, 1948, *Clemens* 41151 (A); ibidem, Bolang, common, 1964, *Hoogland* 9953 (L); ibidem, Siopoto, 1964, *Hoogland* 9903 (L). — E. Highl. Dist.: Mt Wilhelm, 1953—1966, *van Balgooy* 46, 302, 467, 617a (L), *Borgmann* 17 (L), *Brass* 29833 (CANB, L, NY), 30007 (CANB, L), 30047 (CANB, L, NY), *Havel* NGF 17431 (L), *Hoogland & Pullen* 5647 (L, LAE), *Keogh* s.n. (LAE), *Millar* NGF 14663 (CANB, L), *Robbins* 688 (CANB, LAE), *van Royen* NGF 16048 (CANB, L), *Sayers & Millar* NGF 19859 (L), *Streimann & Kairo* NGF 27712 (L), *Walker* ANU 5059 (L), *Womersley* NGF 8836 (CANB, L, LAE), 8930 (BM, CANB, L, LAE); Mt Michael, 1959, *Brass* 31415 (US); ibidem, upper NE. slope, 1959, *Womersley* NGF 11472 (BRI, CANB, L, LAE), 11474 (BRI, LAE); Mt Ormogadzin, W. of Mt O Dan, 1963, *van Royen* NGF 18357a (L); Kerigomna camp, fairly common, 1956, *Hoogland & Pullen* 5536 (BM, CANB, L, LAE). — W. Highl. Dist.: Kubor Ra., Mt Kinkain, 1963, *Vink* 16099, 16204 (L); Mt Hagen, common, 1957, *Robbins* 333 (CANB, L, LAE); Mt Sugarloaf, summit area, 1960, *Hoogland & Schodde* 7116 (L). — S. Highl. Dist.: Mt Giluwe, 1951—1969, *Coode, Wardle & Katik* NGF 40265 (L), *Semple & Rayner* s.n. (MEL), *Shaw Mayer* s.n. (L); Mt Ambua, common, 1966, *Kalkman* 4977a (L). — West. Mt Wilhelmina, summit, 1909, *van Nouhuys* 27 (U, type of *Anaphalis ?mariae* F. v. M. var. *lanuginosa* Laut.).

3. *Anaphalis lorentzii* Lauterbach, Nova Guinea 8 (1914) 86; Mattfeld, Bot. Jahrb. 62 (1929) 429; van Steenis, Bull. Jard. Bot. Btzg III, 13 (1934) 185. — ?*Anaphalis hellwigii* Warb., Bot. Jahrb. 16 (1893) 28; Mattfeld, l.c. (no specimens of this species were seen by the author; Mattfeld presumes that it is not different from *A. lorentzii*; probably the type specimen was destroyed).

Erect herbs, 15—175 cm tall; one or few 4—8 mm thick stems together, (often much) branched or not branched, with creeping stems, densely whitish lanate, with scattered fairly short glandular hairs among the woolly hairs and covered by them; lower part of plant leafless (leaves dropped); internodes 3—10 mm long. Leaves dense, lanceolate, truncate at the base, acute at the top; at both sides with a dense white, dingy-white, or pale brownish, woolly indumentum thinly interspersed with crispy articulate glandular hairs; chartaceous; 2—7 cm long, 0.2—1.3 cm broad. Heads numerous in terminal, composed, dense, 1.5—13 cm broad corymbs; heads on 1—5 mm long densely white-lanate peduncles, campanulate; involucre 6- or 7-seriate, 5—6 mm long, phyllaries obtuse or subacute, often with some teeth in the upper part, one-nerved, stramineous, shining, dingy-white or pale brownish, with a hard basal central part, outer ovate or ovate-oblong,

inner oblong. *Marginal flowers* numerous; corolla 3 mm long; achene oblong, hirsute on the ribs, 0.75 mm long, pappus hairs few, 3.5 mm long. *Disc flowers* fairly many; corolla 3.5 mm long; style—arms truncate, papillose at the top; anthers caudate at the base, subobtuse at the top; achene oblong, thinly pilose, nearly 0.5 mm long, pappus hairs few, 3.5 mm long; receptacle flat.

Distribution: New Guinea.

Collectors' annotations: (semi-) erect, growing in small clumps; phyllaries pale yellowish white, creamy; corolla of marginal flowers white, of disc flowers yellow.

Ecological notes: montane to subalpine (often wet or peaty) grasslands, sedge bogs, landslides, shrubberies, forest edges, young secondary forests, rainforests, roadsides, disturbed soil; on granite. Altitude: 1800—3750 m.

Remarks: *Anaphalis lorentzii* resembles *A. maxima* (OK.) Steen. However, *A. maxima* has oblong or oblong-lanceolate leaves, broadly truncate, nearly auriculate at the base, long-attenuate at the top, subtomentose at the upper side with fairly long crispy articulate glandular hairs and rare woolly hairs.

a. forma *lorentzii*

Leaves 2—7 cm long, 0.3—1.3 cm broad; corymbs 2—13 cm wide.

NEW GUINEA. **E a s t.** Milne Bay Dist.: Goodenough I., 1895, *Armit s.n.* (MEL); Mt Simpson, summit, 1947, *Cruickwell 54* (K); Mt Dayman, 1953, *Brass 22243* (A, CANB, L, LAE), 22908 (A); Mt Maneo, near summit, 1954, *Cruickwell 554* (K). — **C e n t r a l D i s t.:** Murray Pass, 1933—1969, *Brass 4200* (BO, BRI, GH), *Foreman & Wardle NGF 45507* (L), *Ridsdale NGF 36869* (L). — **M o r o b e D i s t.:** Rawlinson Ra., 1941, *Clemens 12370* (A, L); Salawaket Ra., 1937, *Clemens 5650* (A); ibidem, Monarauwe, 1964, *Hoogland 9725* (L); ibidem, Matap, 1940, *Clemens 41169* (A). — **E. Highl. Dist.:** Mt Piora, 1963, *Henty & Carlquist NGF 16571* (L); Mt Wilhelm, 1953—1968, *van Balgooy 396* (L), *Borgmann 17b* (L), *Brass 29884, 30062, 30508* (CANB, L, NY), *Hoogland & Pullen 5672* (BM, L, LAE), *Millar NGF 14662* (CANB, L), *Philipson 3452* (L), *Robbins 697* (CANB, L, LAE), *Sayers & Millar NGF 19873* (L), *Semple & Rayner s.n.* (L, MEL), *Streimann & Kairo NGF 27714* (L), *Vandenberg NGF 35034* (L), *Wade ANU 7440* (L), *Walker ANU 5058* (L); Goroka Subdist., Kanawyroka Cr., 1963, *Millar & van Royen NGF 15982* (L); Goroka, 1960, *Vink NGF 12428* (L); Daulo Pass, 1954, *McKee 1210* (L, LAE); Mt Otto, 1959, *Brass 31124* (US); Mt Michael, common, 1959, *Brass & Collins 31236* (CANB, L). — **W. Highl. Dist.:** Mt Hagen, 1957, *Robbins 342* (CANB); Tomba, 1957, *Robbins 246* (CANB, L, LAE), *Saunders 661* (BM, L, LAE); Kebaka, upper Kaugel R., Alipe Cr., 1962, *Bowers 145* (CANB); Wabag Subdist., Yahi R. Valley, 1960, *Hoogland & Schodde 6794* (L); Yobobos grassland area, source of Lagaip R., 1960, *Hoogland & Schodde 7508* (CANB); Sirunki, 1962, *Walker ANU 397* (L). — **S. Highl. Dist.:** 4 m. N. of Ialibu patrol post near Maragl, not common, 1961, *Pullen 2711* (CANB); Mendi, 1967, *Womersley & Woolliams NGF 37054* (L); track to Mt Giluwe, 1968, *Vandenberg et al. NGF 39751* (L); Ibiwara, Tari Gap, 1966, *Gillison NGF 25175* (L), *Kalkman 4611* (L). — **Madang Dist.:** Finisterre Mts, Saidor Subdist., Lake Naho, 1964, *Sayers NGF 21427* (L). — **W e s t.** Lake Habbema, occasional, 1938, *Brass 9222* (A, L); Mt Wilhelmina, 2 km E. of summit, 1938, *Brass & Meyer-Drees 10115* (A, L); Mt Wilhelmina, 1909, *van Nouhuys 26* (U); Mt Hubrecht, 1909—1913, *Lorentz 1340* (type, BO, L), *van Nouhuys 18* (U), *Versteeg 1222, 2451* (BO, GH, L); Treub Mts, 1913, *Pulle 1088* (BO); Mt Carstensen, 1913, *Kloss s.n.* (K); Wissel Lakes, Enarotali, 1939, *Eyma 4343* (A, BO, L); ibidem, Kebo, rather common, 1960, *Zieck BW 3287* (L).

b. forma *angustifolia* Koster, *nova forma*

Folia angustiora, 3—7 cm longa, 0.2—0.3 cm lata; corymbus angustus, 1.5—5 cm latus.

T y p e: *Brass 11522* (L).

NEW GUINEA. **W e s t.** Baliem Valley, near Wellesey, 1966, *Kostermans & Soegeng 654a* (L); Bele R., 18 km NE. of Lake Habbema, 1938, *Brass 11522* (L, type, A); Lake Habbema, few, 1938, *Brass 9121* (A); Mt Wilhelmina, N. slopes, Warmena R., sporadic, 1938, *Brass & Meyer-Drees 10234* (A, L).

4. *Anaphalis arfakensis* Mattfeld, Bot. Jahrb. 62 (1929) 429; van Steenis, Bull. Jard. Bot. Btzg III, 13 (1934) 184; Kitamura, Bot. Mag. Tokyo 55 (1941) 346.

Herb, sometimes branched, slender, 50—70 cm tall, stems terete, 1.5—4 mm thick, densely whitish lanate, internodes 0.5—1.5 cm long. *Leaves* linear-lanceolate, revolute, acute at the top, herbaceous, glabrous or nearly so above, dingy-whitish lanate below, 3—8 cm long, 0.2—0.4 cm broad. *Heads* numerous, in dense terminal corymbs, peduncles 3—8 mm long; involucre 5 mm long, phyllaries 4-seriate, oblong-lanceolate, acuminate, acute, uni-nerved, membranous, inner ones glabrous, lower part brownish, somewhat glandular, upper part dingy-whitish, outer phyllaries filiform, acute, brownish, densely whitish lanate. *Marginal flowers* numerous; corolla 2.5 mm long; achene short, oblong, hirsute, 0.75 mm long, pappus 3 mm long. *Disc flowers* many; corolla 3 mm long; style-arms truncate, papillose; anthers obtuse at the top; achene and pappus as in marginal flowers; receptacle flat.

Distribution: New Guinea.

NEW GUINEA. West. Arfak Mts, near Hatam, 1875, Beccari s.n. (FI, type); *eod.*, Anggi Lakes, Lake Giji, Iray, 1940, Kanehira & Hatusima 13842 (BO).

Collectors' annotation: corolla white.

Ecological notes: secondary forest. Altitude: 1900 m.

Remark: This species resembles *A. longifolia* (Bl.) DC. and *A. contorta* Hook. f. It differs from both species by its oblong-lanceolate, acute phyllaries. In *A. longifolia* these are ovate, obtuse or subobtuse, in *A. contorta* they are oblong and obtuse.

7. GNAPHALIUM

L., Sp. Pl. (1753) 850; Lessing, Syn. Gen. Comp. (1832) 328; DC., Prodr. 6 (1837) 221; Benth., Fl. Austr. 3 (1866) 652; Benth. & Hook. f., Gen. Pl. 2 (1873) 305; Hook. f., Fl. Br. Ind. 3 (1881) 288; Hoffmann, E. & P., Nat. Pfl. Fam. 4, 5 (1894) 187; Koster in Backer & Bakh., Fl. Java 2 (1965) 393; Drury, N. Zeal. J. Bot. 8 (1970) 222; 9 (1971) 157.

Whitish-lanate annual or perennial herbs. *Leaves* sessile, alternate, entire. *Heads* small, clustered, sessile or subsessile, many-flowered, heterogamous; involucre oblong or campanulate, phyllaries imbricate, 3- or 4-seriate, rigid, membranous, mostly white, yellow or brown, glossy, outer ones gradually shorter. *Marginal flowers* numerous, female; corolla filiform-tubular, 3- or 4-dentate; style-arms filiform; achene more or less 3- or 4-angular, pappus hairs one-seriate, finely dentate, white, often caducous. *Disc flowers* bisexual; corolla tubular, 5-fid; anthers sagittate at the base, with filiform basal appendages; style-arms short, truncate, achene and pappus as in marginal flowers; receptacle flat or basin-shaped, naked, alveolate.

Distribution: about 200 species, almost cosmopolitan.

KEY TO THE SPECIES IN NEW GUINEA

- 1 a. Erect herbs, 5—80 cm tall; heads in clusters 2
- b. Prostrate short herbs, forming mats, 1—8.5 cm tall; heads single. 4
- 2 a. Margins of leaves not revolute; clusters of heads without leaves at the base, heads subsessile or shortly pedunculate. 1. *G. luteo-album*
- b. Margins of leaves revolute; clusters of heads with 2—8 leaves at the base, heads sessile . . . 3
- 3 a. Herbs with basal rosulate shoots and often with stolons; basal part of leaves remaining after leaves have decayed; disc flowers 3—6 2. *G. japonicum*
- b. Herbs without basal rosulate shoots and without stolons; basal parts of leaves not remaining after leaves have decayed; disc flowers 1 or 2 3. *G. involucreatum*

- 4 a. Leaves linear, with revolute margins, subobtusate or subacute at the top; disc flowers 6 or 7, receptacle minute, 1 mm in diam. 4. *G. breviscopium*
 b. Leaves narrowly spatulate, slightly or not revolute at the margins, very shortly acuminate and acute at the top; disc flowers 9—15, receptacle 2—3 mm in diam. 5. *G. brassii*

1. *Gnaphalium luteo-album* L., Sp. Pl. (1753) 851; Benth., Fl. Austr. 3 (1866) 653; Clarke, Comp. Ind. (1876) 114; F. v. M., Descr. Notes Papuan Pl. 6 (1885) 11; Hillebrand, Fl. Hawaiian Is (1888) 201; Moore, Trans. Linn. Soc. Bot. 9 (1916) 85; Merrill, Enum. Phil. 3 (1923) 608; Gagnepain, Fl. Gén. I.-C. 3 (1924) 556; Kearney, Peebles et al., Arizona Fl. (1951) 888; Allen, Fl. N. Zeal. 1 (1961) 699; Koster in Backer & Bakh., Fl. Java 2 (1965) 394; Wilson in Eichler, Suppl. Black, Fl. S. Austr. ed. 2 (1965) 315.

Distribution: Europe, Madeira, Canary Is, Africa, Asia Minor, India, Thailand, Indo-China, China, Japan, Formosa, Malasia, Australia, New Caledonia, New Zealand, Hawaiian Is.; in warm and temperate regions of the Old World, adventive in N. America (acc. to Kearney, Peebles et al., l.c.).

var. *luteo-album*

Herbs, erect, 5—80 cm tall, somewhat branched in the upper part, stem terete, 1.5—2 mm thick, appressed whitish felty-lanate (hairs long). *Leaves* lanceolate (upper ones) or lanceolate-spatulate or spatulate (lower ones), somewhat broadened and truncate at the base, acute or obtuse at the top, uni-nerved, thinly appressed whitish felty-lanate above, densely so below, chartaceous, 1—5.5 cm long, 0.1—0.5 cm broad. *Heads* in terminal and often in a few lower clusters, without leaves at the base, sessile or shortly pedunculate, oblong-campanulate; involucre 3—4 mm long, phyllaries pale brown, rounded, obtuse, or acute, often fringed at the top, outer ones ovate, inner ones oblong. *Marginal flowers*: corolla 2—2.5 mm long; achene oblong, brown, glabrous, 0.5 mm long, pappus 2 mm long. *Disc flowers* 4—7, rarely 10; corolla 2—2.5 mm long; achene and pappus as in marginal flowers; receptacle minute, somewhat basin-shaped.

NEW GUINEA. East. Central Dist.: near Port Moresby, Lawes (fide F. v. M., l.c.). — West. Utakwa R. to Mt Carstensz, 1913, Kloss s.n. (BM, K).

2. *Gnaphalium japonicum* Thunb., Fl. Jap. (1784) 311; Mattfeld, Bot. Jahrb. 62 (1929) 403, 498, p.p.; Kitamura, Mem. Coll. Sc. Kyoto Imp. Univ. B, 13 (1937) 219; Allen, Fl. N. Zeal. 1 (1961) 700; Koster in Backer & Bakh., Fl. Java 2 (1965) 394; Ohwi, Fl. Jap. (1965) 858; Wilson in Eichler, Suppl. Black, Fl. S. Austr. ed 2 (1965) 313.

Herbs, erect, more or less caespitose, 13—45 cm tall, with basal rosulate shoots and often with short or long stolons; stem unbranched or with few branches in the upper part, terete, whitish arachnoid-lanate, 1—2 mm thick. *Leaves* linear-lanceolate (upper ones) or linear-oblancheolate (lower ones), broadened and truncate at the base, obtuse or minutely acuminate and acute at the top, chartaceous, uni-nerved, thinly whitish arachnoid-lanate (afterwards glabrous) above, densely so below, with revolute margins, 1—11 cm long, 0.2—0.6 cm broad, basal part remaining after leaf decayed. *Heads* sessile, 3—5 mm thick, many in a single dense terminal cluster 12—20 mm thick, rarely with few (about 4) smaller clusters in the axils of the upper leaves, clusters with 2—5 leaves at the base; involucre whitish arachnoid-lanate at the base, 6 mm long, phyllaries partly purplish, partly greenish brown, oblong, truncate-obtuse or obtuse, often fringed at the margin, rigid in the upper part, glabrous. *Marginal flowers*: corolla 3.5 mm long; achene ellipsoid-oblong, sparsely papillose, nearly 1 mm long, pappus hairs 4 mm long. *Disc flowers* 3—6 (mostly 4); corolla 3.5 mm long; achene (often empty) and pappus as in marginal flowers; receptacle flat.

Distribution: China, Korea, Japan, Ruykyus, Formosa, New Guinea, Australia, New Caledonia, New Zealand.

NEW GUINEA. East. Milne Bay Dist.: Mt Maneo, 1956, *Crutwell* 736 (K, LAE); Mt Dayman, occasional, 1953, *Brass* 22547 (A, L, LAE). — Central Dist.: Mt Albert Edward, SW. slopes, rare, 1933, *Brass* 4361 (BRI, NY, SH). — E. Highl. Dist.: Mt Wilhelm, 1959–1965, *van Balgooy* 213 (L), *Borgmann* 20 (L), *Brass* 30071 (L); Mt Otto, sporadic, 1959, *Brass & Collins* 31002 (L); Mt Michael, common, 1959, *Brass & Collins* 31249 (L, NY). — W. Highl. Dist.: Mt Sugarloaf, N. slope, 1960, *Hoogland & Schodde* 7159 (L). — S. Highl. Dist.: Mt Giluwe, W. summit, 1961, *Schodde* 1964 (L); Mt Ambua, scattered, 1966, *Vink* 17409 (L). — West. Lake Habbema, 1938, *Brass* 9120 (A, L); Mt Carstensz, Carstenszweide, 1936, *Wissel* 163 (BO).

Collectors' annotation: florets brown.

Ecological notes: montane to alpine, wet or dry grasslands; along tracks; old native camps. Altitude: 2240–3680 m.

3. *Gnaphalium involucreatum* Forst. f., *Fl. Ins. Austr. Prodr.* (1786) 55, n. 291; *Mattfeld, Bot. Jahrb.* 62 (1929) 430, 498, p.p.; *Allen, Fl. N. Zeal.* 1 (1961) 700; *Curtis, Stud. Fl. Tasm.* 2 (1963) 318; *Koster in Backer & Bakh., Fl. Java* 2 (1965) 394; *Wilson ni Eichler, Suppl. Black, Fl. S. Austr. ed. 2* (1965) 313; *Burbidge & Gray, Fl. Austr., Cap. Terr.* (1970) 388.

Herb, erect, simple or bushy, 10–80 cm tall, stems rigid, 1–8, simple or much branched in the upper part or sparsely or much branched (up to 10 branches) in the basal part, 0.5–5 mm thick, appressed white felty-lanate (hairs long), internodes 1–3 cm long. *Leaves* often crowded, lanceolate, broadened and truncate at the base, at first rounded, finally shortly acuminate and acute at the top, upper ones linear or linear-lanceolate, acute, all chartaceous, uni-nerved, thinly appressed white felty-lanate above, densely so below, margins revolute, 1–7.5 cm long, 0.1–0.8 cm broad. *Clusters of heads* single to numerous, terminal or axillary, often on short or long (1–10 cm) branches, in the higher part of the stem, 8–18 mm thick, with 3–8 leaves at the base; heads sessile, 1–1.5 mm thick, involucre 5 mm long, phyllaries oblong, pale brown, often partly purplish, inner ones rounded or obtuse or with two obtuse or rounded teeth, somewhat fringed at the margin, outer ones obtuse or subacute. *Marginal flowers:* corolla 2.5 mm long; achene oblong, brown, sparsely papillose, nearly 1 mm long, pappus 2.5–3 mm long. *Disc flowers* mostly 1, sometimes 2; corolla 2.5 mm long; achene and pappus as in marginal flowers; receptacle minute, somewhat basin-shaped.

Distribution: Japan, Malesia, Australia, Tasmania, New Zealand, Hawaiian Is.

NEW GUINEA. East. Northern Dist.: Mt Aniata, 1959, *Crutwell* 1058 (K). — Central Dist.: Wharton Ra., W. slope, Avios, track Samarai–Murray Pass, 1965, *van Royen NGF* 30127 (L); Mt Tafa, a few plants, 1933, *Brass* 4925 (NY). — Morobe Dist.: Edie Creek Rd, above Wau, 1963, *van Royen NGF* 16309 (L); Lae Subdist., Gevak-Misok village, 1960, *Gillison* 13 (BRI); Sattelberg, Sambanga, 1937, *Clemens* 6925a (A); Ogeramngang, 1936, *Clemens* 4478 (A); below Tobou, 1936, *Clemens* 4439 (A); Cromwell Mts, Mannasat, 1964, *Hoogland* 9427 (L); Wantoat, 1940, *Clemens* 10960 (A). — E. Highl. Dist.: Aiyura, slope behind Agr. Stat., 1954, *van Royen* 4458 (L); Lower Bena Bena R., 1957, *Robbins* 861 (A, BM, CANB, L, LAE); near Kerigomna camp, fairly common, 1956, *Hoogland & Pullen* 5511 (A, BM, BRI, CANB, L, LAE); Chimbu valley, Pombomere, 1960, *Borgmann* 373 (L); Mt Wilhelm, 1957–1966, *van Balgooy* 509 (L), *Brass* 30289 (L, NY), 30640 (L), *McVean & Wade ANU* 7135 (L), *Pullen* 355 (BM, CANB, L, LAE). — W. Highl. Dist.: Waghi-Jimmy Divide, Warapiri R., N. of Nondugl, scattered, 1963, *van Royen NGF* 18294 (BRI, L); Wabag Subdist., near Yogos, lower Tale R., 1960, *Hoogland & Schodde* 6707 (CANB); Lai valley, 8 m. W. of Wabag, 1960, *Robbins* 3047 (CANB); Sirunki, NE. slopes of Putidi Hill, 1962, *Walker ANU* 465 (L); Lake Iviva, 1962, *Womersley NGF* 15293 (L), 1965, *Flenley ANU* 2505 (L); Yobobos grassland area, source of Lagaip R., 1960, *Hoogland & Schodde* 7456 (L); top of Lagap-Kandep Divide, 1965, *Eichler* 18271

(L). — S. Highl. Dist.: Tari Subdist., Ibiwara, very local, *Kalkeman* 4658 (L). — West. Baliem R., 1938, *Brass* 11727 (A, L); *eod.*, Maki, 1958, *van Leeuwen MAKI* 18 (L); Swart valley, Kadubaka, 1958, *Bergman* 450 (S); Wissel Lakes, Enarotali, foot of Boebeiro, 1939, *Eyma* 4378 (A, BO, BRI, L).

Collectors' annotations: annual, up to 1.20 m tall; leaves dark green above; flowers (yellowish) brown, brownish, yellow.

Ecological notes: montane to subalpine dry or peaty grasslands; wet mixed vegetation including *Phragmites*; (*Pandanus*-)marsh; old gardens; on bare ground of landslides and along gullies; roadsides; on loam. Altitude: 1175—3575 m.

4. *Gnaphalium breviscopum* Mattfeld, Bot. Jahrb. 68 (1937) 264. — *G. clemensiae* Mattfeld, Bot. Jahrb. 70 (1940) 475.

Short herb 1—8.5 cm tall, forming mats, with stolons, stems 0.5—1 mm thick. *Leaves* rosulate at the base or on top of prostrate, filiform, angular, glabrous stolons bearing basal parts of decayed leaves. Leaves appressed, linear, canaliculate, uni-nerved, with revolute margins, somewhat broadened at the base, subobtusate or subacute at the top, chartaceous, thinly whitish felty-lanate (afterwards glabrous) above, densely so below, 0.5—2 cm long, 0.05—0.1 cm broad. *Heads* solitary at the top of leafy, whitish felty-lanate, erect, terete, 0.5—8 cm long stems; involucre oblong-campanulate, 6—8 mm long (Mattfeld mentions 8—10 mm for *G. clemensiae*), phyllaries oblong, acute, light brown, outer whitish arachnoid, inner ones glabrous. *Marginal flowers:* corolla 4 mm long; achene oblong-ellipsoid, shortly pilose, light brown, nearly 1 mm long, pappus 4.5—5 mm long. *Disc flowers* 6 or 7; corolla 4 mm long; achene cylindrical, thinly minutely pilose, often empty, pappus like that of marginal flowers; receptacle minute, somewhat basin-shaped, 1 mm in diam.

Distribution: New Guinea.

NEW GUINEA. East. Central Dist.: Mt Albert Edward, common, 1933, *Brass* 4345 (BRI, GH, type). — Morobe Dist.: Salawaket Ra., 1937, *Clemens* 5909 (A, type of *G. clemensiae* Mattf.); Mt Bangeta, summit, 1963, *van Royen NGF* 20027 (L); Matap, 1940, *Clemens* 41153 (A). — E. Highl. Dist.: Mt Michael, common, 1959, *Brass & Collins* 31206 (L); Mt Wilhelm, 1957—1966, *van Balgooy* 78, 116, 237, 353, 354, 570, 805 (L), *Borgmann* 81 (L), *Brass* 30160 (L, NY), *McVean & Wade ANU* 7206 (L), *Robbins* 1280 (CANB), *van Royen NGF* 16004 (L). — W. Highl. Dist.: Kubor Ra., Mt Kinkain, rather common, 1963, *Vink* 16208 (L). — S. Highl. Dist.: Mt Giluwe, W. summit, 1961, *Schodde* 1947 (L); *eod.*, E. slopes, 1969, *Coode et al. NGF* 40223, 40275 (L). — West. Mt Wilhelm, 2 km E. of summit, common, 1938, *Brass & Meyer-Drees* 10216 (A, L); Lake Habbema, 1938, *Brass* 9025, 9587 (A, L).

Collectors' annotations: solitary or growing in large patches, rosettes forming mats; leaves dull green above; flowering stems at first erect, becoming curved-over in fruit; flowers yellowish, light yellow, white.

Ecological notes: wet to dry, often stony, subalpine to alpine grasslands; bare (rocky) soil; open bogs; survives regular trampling; on peat, on slate. Altitude: 3225—4350 m.

5. *Gnaphalium brassii* Mattfeld, Bot. Jahrb. 68 (1937) 265.

Short herbs 1—5 cm tall, forming mats. Leaves rosulate at the base or on top of prostrate, filiform, angular, glabrous, 0.5—1 mm thick stolons bearing basal parts of decayed leaves. Leaves appressed, narrowly spatulate, somewhat canaliculate, uni-nerved, slightly or not revolute at the margins, somewhat broadened at the base, very shortly acuminate at the top, chartaceous, densely whitish felty-lanate at both sides, afterwards glabrous above, 0.5—2.5 cm long, 0.3—0.5 cm broad. *Heads* solitary, terminal, at the



Fig. 2. a. *Gnaphalium breviscopum*, habit, $\times 2$ (Brass 4345). — b. *Gnaphalium brassii*, habit, $\times 2$ (Brass 4401).

top of leafy 1—4 cm long stems, or subsessile; involucre campanulate, 9—10 mm long, phyllaries oblong, acute, light brown, outer ones whitish arachnoid, inner ones glabrous. *Marginal flowers*: corolla 5 mm long; achene oblong-ellipsoid, glabrous, nearly 1 mm long, light brown, thinly minutely pilose, pappus 6 mm long. *Disc flowers* 9—15; corolla 4—5 mm long; achene like that of marginal flowers, often empty, pappus 6 mm long; receptacle more or less flat, 2—3 mm in diam.

Distribution: New Guinea.

NEW GUINEA. East. Milne Bay Dist.: Mt Ganaina, 1962, Cruttwell 1286 (L); Mt Maneo, summit, E. side, 1956, Cruttwell 778 (K). — Northern Dist.: Mt Aniata, 1959, Cruttwell 1042 (K). — Central Dist.: Wharton Ra., W. slope, track Avios—Murray Pass, 1965, van Royen NGF 20469 (L); Murray Pass, 1933, Brass 4673 (BRI, GH, NY); *ead.*, Tsjidibombo, 1965, van Royen NGF 30121 (L); Mt Albert Edward, 1933, Brass 4401 (BRI, type; GH).

Collectors' annotation: prostrate in dense grey masses, in large patches, forming extensive mats; phyllaries pale green; corolla of marginal flowers straw-coloured, florets pale yellow, yellowish, white, pink.

Ecological notes: (open) grasslands, bare ground of wet grassland; rocky slope; dry roadsides. Altitude: 2790—3680 m.

Remark: Mattfeld, Bot. Jahrb. 70 (1940) 473, described a species of *Raoulia* Hook. for New Guinea: *R. chiliastra*, from Mt Saruwaged, 3750—4000 m alt., 1937, Clemens 5898, 5910. Both specimens have been destroyed in Berlin. No specimens of this species have been seen by the present author. Mattfeld indicated that no clear differences can be found between the genera *Gnaphalium* and *Raoulia*. For this reason, as he remarked, he could have named this species as *Gnaphalium chiliastrum* as well. Most species of *Raoulia* occur in New Zealand, very few in Tasmania. According to Allan, Fl. N. Zeal. 1 (1961) 701, a few species of *Raoulia* have been described from New Guinea. In the Kew Index, however, only *R. chiliastra* is enumerated from New Guinea.

8. PLUCHEA

Cass., Bull. Sc. Soc. Philom. Paris (1817) 31; Dict. Sc. Nat. 42 (1826) 1; Lessing, Syn. Gen. Comp. (1832) 207; Benth. & Hook. f., Gen. Pl. 2 (1873) 290; Hoffmann, E. & P., Nat. Pfl. Fam. 4, 5 (1894) 176; Koster in Backer & Bakh., Fl. Java 2 (1965) 390.

Shrubs, subshrubs, or rarely perennial herbs. *Leaves* alternate. *Heads* corymbose or rarely solitary and terminal, usually small, heterogamous; involucre ovoid, campanulate, or hemispherical, phyllaries imbricate, few- or many-seriate, outer gradually shorter, ovate or lanceolate, herbaceous or membranous. *Marginal flowers* numerous, many-seriate, female; corolla tubular-filiform, shortly 3- or 4-dentate; style-arms exserted, thin; achenes small, angular, pappus setaceous, hairs uni-seriate, thin, scabrid. *Disc flowers* few, masculine; corolla infundibuliform, with a 5-lobed limb; anthers sagitate, caudate, with acute appendages on either side at the base, obtuse at the apex; style undivided or shortly bifid; achenes often rudimentary, pappus setaceous; receptacle flat, naked.

Distribution: about 70 species, mainly in S. and C. America, further in N. America, tropical Africa, Canary Is, S. Asia, Australia.

1. *Pluchea indica* (L.) Less., *Linnaea* 6 (1831) 150; DC., *Prodr.* 5 (1836) 451; Benth., *Fl. Austr.* 3 (1866) 527; Clarke, *Comp. Ind.* (1876) 93; Hook. f., *Fl. Br. Ind.* 3 (1881) 272; Boerl., *Handl.* 2 (1891) 239; Valetton, *Bull. Dép. Agr. Ind. Néerl.* 10 (1907) 69; White, *Proc. R. Soc. Queensl.* 34 (1922) 60; Merrill, *En. Phil.* 3 (1923) 606; Ridley, *Fl. Mal. Pen.* 2 (1923) 194; Gagnepain, *Fl. Gén. I.-C.* 3 (1924) 522; Mattfeld, *Bot. Jahrb.* 62 (1929) 425; Degener, *Fl. Hawaii.* 3 (1934) fam. 344, ill.; Craib in Kerr, *Fl. Siam.* 2, 3 (1936) 266; Koster in Backer & Bakh., *Fl. Java* 2 (1965) 391. — *Baccharis indica* L., *Sp. Pl. ed.* 2 (1763) 1205.

Shrub, stem and branches ribbed, finely shortly crispy-hairy, stem 7–10 mm thick. *Leaves* very shortly petiolate or sessile, obovate, attenuate to the base, acute or mucronate at the apex, acutely serrate-dentate except for the entire basal part, subglabrous, obscurely glandular at both surfaces, 2.5–9 cm long, 1–5.5 cm broad. Corymbs terminal or axillary, more or less dense, 2.5–12.5 cm wide, branches obliquely patent; heads pedunculate or subsessile, narrowly cylindric; involucre c. 4 mm long, phyllaries 6- or 7-seriate, obtuse, outer ovate, herbaceous, finely crispy-hairy, persistent, inner lanceolate, scarious, ciliate at the apex, falling off together with the ripe achenes. *Marginal flowers*: corolla 3–3.5 mm long; style-arms far exserted, acute; achenes nearly turbinate, brown with pale ribs, glabrous, c. 1 mm long, pappus white, 3–3.5 mm long. *Disc flowers* 2–6; corolla c. 4 mm long; finally anthers and style-arms exserted; achenes rudimentary, pappus as in marginal flowers; receptacle glabrous.

Distribution: India, Thailand, Indo-China, S. China, Japan, Malesia, N. Australia, Hawaiian Is, Christmas I, Eniwetok.

NEW GUINEA. East. Milne Bay Dist.: Cape Vogel Pen., near Tapio, locally common, 1954, *Hoogland* 4282 (A, BRI, CANB, K, L, LAE). — Central Dist.: Domara R., bank, 1926, *Brass* 1593 (A, BRI, K); Kapa Kapa, 1925, *Brass* 807 (A, BRI, K); 5 m. N. of Kapa Kapa, 1962, *Schodde* 2731 (A, BO, BRI, CANB, K, L, LAE); Kapa to Kaili, *MacGregor s.n.* (MEL); Tupuselei, 1962, *Pullen* 3290 (CANB); Bootless Inlet, 1962, *Pullen* 3231 (CANB); Port Moresby, *Goldie s.n.* (MEL), 1918, *White* 114 (BRI); Rouku, Porebada Rd near Waigani Junction, 1969, *Pulsford* UPNG 163 (L); Kanosia, 1935, *Carr* 11011 (CANB, BM, L, NY); near Lea, ½ m. SE. of Papa, 1962, *Schodde* 2685 (A, BRI, CANB, K, L, LAE); between Roger's Airstrip and Manu Manu, 1962, *Pullen* 3498 (CANB, LAE); 1½ m. E. of Delena, common, 1962, *Darbyshire* 794 (A, BO, BRI, CANB, K, L). — Gulf Dist.: Malalaua R., wharf near mouth of Tauri R., 1966, *Schodde* 4511 (L). — Western Dist.: Daru I., abundant, 1936, *Brass* 6216 (A, BO, BRI, L); near Dutch boundary, 1890, *MacGregor s.n.* (MEL); mouth of Bensbach R., 1967, *Ridsdale & Galore* NGF 33633 (L, LAE). — P a p u a. Vatorata, *Turner s.n.* (BRI). — West. Merauke, 1904–1956, *Koch s.n.* (L), *McKee* 1686 (L, LAE), *van der Sijde*

BW 4008 (CANB, L), *Versteeg* 1843 (BO, K, L, U); near Merauke R., Windou, 1941, *Anta* 143 (BO, K, L); S. and SW. New Guinea, *Zippelius* s.n. (L).

Without locality: 1880, *Chalmers* s.n. (MEL); *Reedy* s.n. (MEL).

Collectors' annotations: small tree, erect to ascending, often much branched large leafy gregarious shrub, 1.5—3 m tall; leaves (dull) light green at both surfaces, aromatic; corolla (pale) purple, purple-pink, pink-white, pink, lavender tinge, light mauve, or white; stamens deep-lilac.

Ecological notes: beaches, tidal flats, mangroves, inner edges of mangrove, coastal sand-dune scrub, brackish swamp forest, *Melaleuca* savannah swamp — monsoon forest ecotone, grasslands (sometimes inundated), ditch- and riverbanks, roadsides and old garden sites in open savannah grasslands. Altitude: 0—20 m.

9. BLUMEA

DC. in Guill., Arch. Bot. 2 (1833) 514, *nom. cons.*; Benth. & Hook. f., Gen. Pl. 2 (1873) 289; Boerl., Handl. 2 (1891) 237; Hoffmann, E. & P., Nat. Pfl. Fam. 4, 5 (1894) 175; Randeria, Blumea 10 (1960) 205; Koster in Backer & Bakh., Fl. Java 2 (1965) 387.

Herbs or undershrubs. *Leaves* alternate, penninerved. *Heads* mostly numerous, heterogamous, many-flowered, in terminal or axillary panicles or solitary; involucre campanulate, phyllaries few- to many-seriate, imbricate, acute, outer gradually shorter, inner scarious. *Marginal flowers* numerous, many-seriate, female; corolla filiform-tubular, shortly 3-lobed; style exserted, arms linear or filiform, more or less flat, obtuse, papillose; achene small, oblong, more or less angular or subterete, ribbed, hairy, with an oblique white cartilaginous basal ring, pappus setaceous, hairs in one row, thin, finely ciliate, often caducous. *Disc flowers* bisexual; corolla infundibuliform-tubular, 5-lobed, lobes deltoid, acute; anthers sagittate, finely caudate at the base, with acuminate auricles, with an obtuse apical appendage; achene and pappus like those of marginal flowers; receptacle more or less flat or slightly convex, naked, alveolate.

Distribution: about 100 (or less) species in Africa, Madagascar, Iran, Afghanistan, India, Ceylon, Thailand, Laos, Vietnam, China, Formosa, Malesia, Solomon Is, N. Australia, New Caledonia, New Hebrides, Fiji Is.

KEY TO THE SPECIES IN NEW GUINEA

- 1 a. Climbing; outmost phyllaries firm, ovate, concave 1. *B. riparia*
- b. Erect; outmost phyllaries herbaceous, linear-lanceolate or lanceolate 2
- 2 a. Leaves elliptic or oblong, coarsely dentate, often runcinate; petiole with 1—4 pairs of appendages 2. *B. junghuhniana*
- b. Leaves variously shaped; petiole without appendages 3
- 3 a. Upperside of leaves densely covered with glandular hairs; underside of leaves, stem, and peduncles covered with a soft tawny-greyish woolly tomentum composed of long somewhat undulate hairs; phyllaries linear-lanceolate 3. *B. arnakidophora*
- b. Upperside of leaves pubescent, scabrid, or glabrous, often glandular; underside variously pilose or subglabrous, often minutely glandular; phyllaries variously shaped 4
- 4 a. Branches elongated; higher leaves semiamplexicaul; heads single or few in thin inflorescences 4. *B. tenella*
- b. Branches not obviously elongated; higher leaves sessile or petiolate; heads single to numerous 5
- 5 a. Leaves oblanceolate, obovate-oblong, or lanceolate, remotely dentate or subentire; inflorescences thin, composed of one or few heads, branches diffuse 5. *B. saxatilis*
- b. Leaves variously shaped; inflorescences composed of numerous heads 6
- 6 a. Leaves lanceolate, attenuate at both ends; involucre 4- or 5-seriate 6. *B. stenophylla*
- b. Leaves variously shaped but not lanceolate; involucre 5—8-seriate 7

- 7 a. Stem dark purplish brown; leaves subcoriaceous, dark-coloured when dry; panicles pyramidal; involucre 9–10 mm long, purplish 7. *B. papuana*
 b. Stem pale or dark-coloured; leaves submembranous or chartaceous; panicles not obviously pyramidal; involucre 4–10 mm long, not purplish 8
 8 a. Involucre 8-seriate; phyllaries elliptic-lanceolate 8. *B. arfakiana*
 b. Involucre 5- or 6-seriate; phyllaries linear-lanceolate or oblanceolate 9
 9 a. Leaves finely remotely dentate, entire in the lower part; panicles ample, often leafy (to 45 cm long and 25 cm wide) 9. *B. sylvatica*
 b. Leaves coarsely (or rarely finely) dentate-serrate, often runcinate; panicles elongate, branches often thyrsoid, heads more or less clustered at the apex 10. *B. lacera*

1. *Blumea riparia* (Bl.) DC., Prodr. 5 (1836) 444; Boerl., Handl. 2 (1891) 239; Kitamura, Bot. Mag. Tokyo 55 (1941) 346; Koster, Blumea 6 (1948) 265; Randeria, Blumea 10 (1960) 213; Koster in Backer & Bakh., Fl. Java 2 (1965) 387. — *Conyza riparia* Bl., Bijdr. (1826) 899, *nom. illeg.*, non H.B.K. (1820); Miq., Fl. Ind. Bat. 2 (1856) 51. — *Blumea semivestita* DC., Prodr. 5 (1836) 445, *p.p.*; Koster, Blumea 6 (1948) 265. — *Blumea pubigera* (L.) Merrill, Phil. J. Sc. 14 (1919) 250, *basionym Conyza pubigera* L. *excl. fide* Craib, Fl. Siam. 2 (1936) 262; Mattfeld, Bot. Jahrb. 62 (1929) 421; Hu, Quart. J. Taiwan Mus. 18 (1965) 328.

Climbing herb or undershrub, branched, stem glabrous or scabrid, ribbed, rigid, purplish brown, 2–4 mm thick, branches oblique, often long, ribbed, purplish brown, scabrid. *Leaves* 0.5–8 mm petiolate, (sometimes broad) elliptic or oblong, long (sometimes short) and acutely acuminate, sometimes somewhat curved in the upper part, rounded, subacute or shortly acute at the base, dentate, scabrid or subglabrous, somewhat glossy above, shortly sparsely pilose below, chartaceous, 2–12 cm long, 1–5 cm broad, teeth 5–10 mm distant, short, deltoid or subaculeate. *Panicles* axillary and terminal, 3–30 cm long, on 2–6 cm long peduncles, with minute leaflike bracts at the base of the branches; heads on 3–14 mm long, slender peduncles often bearing one minute linear bract; involucre 6–8 mm long, inner phyllaries linear-lanceolate, acute, uninerved, whitish pilose in the upper part (hairs fairly long), outmost much smaller, firm, ovate, concave, obtuse, whitish pilose (hairs fairly long). *Marginal flowers*: corolla 4 mm long; style-arms much exerted; achene subterete, prominently ribbed, 1 mm long, sparsely pilose, pappus dingy-white, 5 mm long. *Disc flowers* 5–8; corolla 5 mm long, with long white hairs at the top, lobes deltoid, obtuse and shortly papillose at the apex; style exerted; achene and pappus like those of marginal flowers; receptacle more or less densely pilose around the pits, hairs white, long, erect, somewhat flexuous.

Distribution: India, Thailand, Vietnam, China, Ryukyu Is, Formosa, Malesia, Solomon Is, New Caledonia, New Hebrides.

Remark: As the name *Blumea riparia* (Bl.) DC. is based on a later homonym, it is illegitimate. The present author had not the opportunity to seek out the legitimate name as not all taxonomic synonyms have been studied.

a. forma *riparia*

Leaves oblong or elliptic, rounded, subacute, or shortly acute at the base, shortly or long-acuminate at the apex.

Distribution: as the species.

NEW GUINEA. East. New Britain: W. Nakanai, Malalai, near C. Hoskins, 1954, *Floyd NGF 6604* (A, BO, BRI, CANB, L, LAE); Talasea Subdist., Mt Lollo, extinct volcano, upper slopes and top, 1959, *White NGF 10849* (L, LAE). — Milne Bay Dist.: Misima I., Narian, 1956, *Brass 27649* (K, L, LAE); Ferguson I., Saibutu, 1956, *Brass 25944* (A, K, L, LAE); Menapi, Cape Vogel Pen., 1953, *Brass 21731* (A, L,

LAE); Gwariu R., Biniguni Camp, 1953, *Brass* 23689 (A, L). — Northern Dist.: Mt Lamington, 1953, *Hoogland* 3339 (A, BM, CANB, LAE). — Central Dist.: Koitaki, 1935, *Carr* 11956 (BM, L); Port Moresby, 1882, *Lawes s.n.* (MEL), 1884, *Lawes s.n.* (MEL, L); Veiya, 1935, *Carr* 11682 (BM, L). — Morobe Dist.: Wau, McAdam Park, 1962, *Millar NGF* 14573 (L); Oomsis, 1959, *Brass* 29272 (L); Finschhafen, 1945, *Sawyer* 233 (L, UC); Sattelberg, 1889, *Warburg* 21404 (A, det. *B. chinensis* var. *villosa* by Warburg), 1935, *Clemens* 1037 (L); Heldsbach, 1936, *Clemens* 3210a (A, Z); Boana, 1940, *Clemens* 41456 (A); Wantoat, 1940, *Clemens* 40909 (A); Kajabit Mission, 1939, *Clemens* 10865 bis (A). — Gulf Dist.: between Iokea and Apinaipi, 1954, *Brown* 359 (A); C. Cupola, 1926, *Brass* 1363 (GH, P). — S. Highl. Dist.: Tage, Lake Kutubu, 1961, *Schodde* 2146 (L); Tari Subdist., Tigibi, 1966, *Vink* 16841 (L). — Madang Dist.: Konstantinhafen, 1887, *Holtrung* 590 (BO, MEL); Josephstaal, 1958, *White NGF* 10319 (LAE). — Sepik Dist.: Angoram Subdist., Timbunke, 1959, *Pullen* 1741 (CANB); Wewak—Maprik Rd, Tarengi near Rapundogum, 1959, *Robbins* 2242 (CANB); Maprik Subdist., Pr. Alexander Ra., S. of Mt Turu, near Ambakanja, 1959, *Pullen* 1615 (CANB); Aitape Subdist., between Marok and Siauti, 1961, *Darbyshire & Hoogland* 7925 (L); Wantipi (on Bliiri R.), 1961, *Darbyshire & Hoogland* 8246 (L); Sepik region, 1912—1913, *Ledermann* 8554 (K). — SE. New Guinea: 1878, 1885, *Chalmers s.n.* (MEL); Islands near SE. coast of New Guinea, 1884, *Armit* 45 (MEL). — West. Hollandia Dist.: Bivak Hollandia, 1910, *Gjellerup* 313 (L); Swart valley, Kadubaka, 1958, *Bergman* 67 (S); Nassau Ra., 1926, *Docters van Leeuwen* 10539 (BO, L). — Southern Dist.: Iwoer R., near confluence with East Digoel R., 1959, *Kalkman BW* 8544 (L). — Geelvink Bay Dist.: Japen I., Mt Wawah, 1939, *Aet & Idjan* 48 (L); Nabire, 1940, *Kanehira & Hatusima* 11689 (BO). — Vogelkop Pen.: Arfak Mts, Putat, 1872, *Beccari* 855 (FI); Momi, 1948, *Kostermans* 2603 (L); Klamono, S. of Sorong, 1948, *Pleyte* 609 (L).

Collectors' annotations: straggling soft shrub, scrambler, 1—5 m tall, leaves fleshy; outer phyllaries green, inner ones light greenish white; corolla (pale, greenish, ochre-, orange-) yellow, (greenish) white.

Ecological notes: climbing in trees, shrubs, and tall grasses; edges of primary forest; secondary forests, garden regrowth, along tracks, along streams. Altitude: 0—2000 m.

b. forma *angustifolia* Koster, Blumea 4 (1941) 490; Randeria, Blumea 10 (1960) 215.

Upper leaves oblong-lanceolate or lanceolate, shortly acute at the base, long attenuate at the apex.

Distribution: Malesia.

NEW GUINEA. East. Milne Bay Dist.: Normanby I., Lebudowa R., 1956, *Brass* 25539 (A, L). — E. Highl. Dist.: Buglapu, 1960, *Borgmann* 441 (L). — West. Wandammen Bay, Job I., rather common, 1962, *Schram BW* 14988 (L).

Collectors' annotations: scrambling soft shrub, leaves fleshy; corolla yellow.

Ecological notes: young secondary forest; gravelly river bank. Altitude: 40—1800 m.

2. *Blumea junghuhniana* (Miq.) Boerl., Handl. 2 (1891) 239; Koster, Blumea 4 (1941) 485; Randeria, Blumea 10 (1960) 235; Koster in Backer & Bakh., Fl. Java 2 (1965) 388. — *Conyza junghuhniana* Miq., Pl. Junghuhn. (1855) 449; Fl. Ind. Bat. 2 (1856) 55. — *Conyza dasycoma* Miq., o.c. 56. — *Blumea dasycoma* (Miq.) Boerl., l.c.

Large herb, stem terete, light greyish silky tomentose, afterwards glabrous, 6—10 mm thick. *Leaves* petiolate, elliptic or oblong, acute or subacute at the base, acute at the apex, coarsely dentate, often runcinate (teeth different in length, 1—20 mm long, obtuse or acuminate and acute), chartaceous, shortly tomentose above, densely light greyish lanate below, minutely glandular at both surfaces, 6.5—25 cm long, 2—11.5 cm broad; petiole 0.5—4 cm long, smaller in the inflorescence, light greyish silky tomentose, provided with 1—4 pairs of lanceolate appendages, 2—15 mm long. *Inflorescence* terminal, ample, corymbose, 20—40 cm long, 15—30 cm wide, axis light greyish silky tomentose, branches

patent, sometimes nearly perpendicular to the axis; heads in the upper half of the branches, peduncle dingy lanate, 1–4 mm long; involucre 9 mm long, phyllaries 5-seriate, linear, finely acuminate, acute, outer densely, inner thinly pilose, hairs long, white, more or less undulate. *Marginal flowers*: corolla 6.5 mm long, purplish (when dry) in the upper part; style-arms flat, obtuse; achene linear, sparsely patent pilose, 1.5 mm long, pappus tawny, 6 mm long. *Disc flowers* 5; corolla 12 mm long, purplish (when dry) in the upper part, lobes acute, glandular, with or without some rigid hairs; achene and pappus like those of marginal flowers; receptacle fimbriiferous, glabrous.

Distribution: Malasia.

NEW GUINEA. West. Vogelkop Pen.: Ajamaroe region, Semoe, 1952, *Brongersma* 25 (L).

Remark: The description was prepared from Indonesian specimens, since the single specimen thusfar known from New Guinea has very young heads.

3. *Blumea arnakidophora* Mattfeld, Bot. Jahrb. 69 (1938) 286; Randeria, *Blumea* 10 (1960) 232. — *Blumea densiflora* auct., non DC.: Mattfeld, Bot. Jahrb. 62 (1929) 422.

Large herb or shrub, 1.1 m tall, stem 5–12 mm thick, densely covered with a soft tawny-greyish woolly tomentum, hairs long, somewhat undulate, many-celled, cells long; internodes 1–12 cm long. *Leaves* sessile or subpetiolate, oblong, elliptic-oblong, lanceolate-oblong, or rarely obovate-oblong, (often long-) tapering at both ends, obtuse or subacute at the apex, indistinctly or clearly mucronulate-serrate-dentate, densely covered with glandular hairs (tomentose on the nerves) above, densely covered with a soft tawny-greyish woolly tomentum (composed of long, somewhat undulate hairs) below, 8–29 cm long, 1.5–8 cm broad, in the inflorescence smaller. *Panicles* terminal, leafy, long, ample, 18–55 cm long, 8–15 cm wide; heads subsessile or shortly pedunculate, peduncle 2–10 mm long, densely tomentose like stem and underside of leaf; involucre 9–10 mm long, phyllaries linear-lanceolate, long-tapering, finely acuminate, more or less densely lanuginose (hairs long, appressed), ciliate at the margin of the upper part. *Marginal flowers*: corolla 5.5 mm long; style-arms filiform, obtuse, much exerted; achene prominently ribbed, 1 mm long, sparsely pilose, hairs patent, pappus tawny, 5–6 mm long. *Disc flowers* 7–18; corolla 5–6 mm long, lobes glandular, with a few white hairs on the upper part; style-arms terete, fairly short, much exerted; achene and pappus like those of marginal flowers; receptacle densely glandular around the pits, with few erect hairs.

Distribution: Borneo (Mt Kinabalu), New Guinea.

NEW GUINEA. East. Central Dist.: near Port Moresby, 1884, *Edelfeldt* 42 (MEL); Boridi, 1935, *Carr* 12991, 14536 (BM, L); Mt Tafa, abundant, 1933, *Brass* 4930 (A, BRI). — Morobe Dist.: Edie Creek, relatively common, 1962, *van Royen* NGF 16046 (CANB, L); Wau—Edie Creek Rd, 1954, *Womersley & Floyd* NGF 6247 (LAE); Sattelberg, 1937, *Clemens* 5241a (A; type, destroyed in B); Samanzing, 1938, *Clemens* 8959 (A); Zatarl, SE. from Boana, 1963, *van Royen & Millar* NGF 15686 (BRI, L); Finisterre Mts, 1880, *Hellwig* 298 (K, identified as *B. densiflora* by Mattfeld, 1929 l.c.). — E. Highl. Dist.: Asaro-Mairifutica Divide, Daulo Camp, 1957, *Pullen* 444 (BM, L, LAE); Mt Wilhelm, 1959, *Brass* 30502 (L), *Borgmann* 335 (L). — W. Highl. Dist.: Kubor Ra., Uinba, 1963, *Vink* 16537 (L); near Wankl, 5 km SE. of Mt Hagen Station, 1956, *Hoogland & Pullen* 5809 (CANB, L; in part of this collection some of the teeth of the leaves are much bigger than the other ones); Birap Lake, Lai valley near Wabag, 1960, *Robbins* 2903 (CANB); Poio, Yaki R. valley, 1960, *Hoogland & Schodde* 6796 (CANB); Kepilam, Lagaip valley, 1960, *Hoogland & Schodde* 7433 (L). — S. Highl. Dist.: upper Kaugel valley, Alipe Cr., Kebaka, 1962, *Bowers* 140 (CANB). — Sepik Dist.: Telefomin, Subdist., Oksapmin, 1968, *Henty et al.* NGF 41734 (L). — West. Bele R., 18 km NE. of Lake Habbema, plentiful, 1938, *Brass* 11081 (A, L); Wissel Lake region, Dejatej, 1939, *Eyma* 5187 (BO); Arfak Mts, near Minjambau, Mt Nerimbau, rather common, 1962, *Koster* BW 13867 (L).

Collectors' annotations: erect shrub or (woody) herb, often woody at the base, annual, single-stemmed or sparsely branched, 1–2.25 m tall, stems densely creamy woolly; leaves in a broad rosette, with a mint- or *Artemisia*-like smell when crushed; corolla yellow, yellowish, green, or yellowish white with light green lobes. *Leaves used* by native women for the first 'washing' of new born babies and as diaper and toilet paper for babies.

Ecological notes: grasslands, secondary vegetations (also on landslips), forest edges, open places in forest; gardens, roadsides; (stony, rocky) creek banks. Altitude: 1300–2700 m.

4. *Blumea tenella* DC. in Wight, Contr. Bot. Ind. (1834) 13; DC. in Decaisne, Nouv. Ann. Mus. Hist. Nat. Paris 3 (1834) 83; DC., Prodr. 5 (1836) 433; Boerl., Handl. 2 (1891) 237; Randeria, *Blumea* 10 (1960) 289; Koster in Backer & Bakh., Fl. Java 2 (1965) 389. — *Conyza tenella* (DC.) Miq., Fl. Ind. Bat. 2 (1856) 40. — *Conyza humifusa* Miq., o.c., 41. — *Blumea humifusa* (Miq.) Clarke, Comp. Ind. (1876) 72; Boerl., Handl. 2 (1891) 237; Koster, *Blumea* 6 (1948) 265.

Small or fairly small diffuse herb, strongly branched in the lower part, 13–40 cm tall, stem somewhat grooved, (sub)glabrous, sparsely glandular, 1–4 mm thick, branches elongated, up to 40 cm long, thin, apices whitish villous; internodes 1–5 cm long. *Leaves* sessile, truncate-rotundate at the base, higher ones semiamplexicaul, lowest ones gradually attenuate to the base, all membranous or chartaceous, ovate or ovate-oblong, or oblong, acute and acuminate at the apex, finely acutely dentate, thinly pilose or glabrous above, more or less villous (especially on the nerves) below, 1.5–10 cm long, 0.3–2.5 cm broad, highest ones smaller, linear. *Heads* few, single or in thin inflorescences composed of 2 or 3 heads in the axils of the highest leaves, peduncles filiform, more or less villous, 1.5–6 cm long; involucre 6–9 mm long, phyllaries linear or lanceolate, gradually attenuate, filiform in the upper part, with a dark central line with glandular hairs and a few long flexuous white hairs. *Marginal flowers:* corolla 3.5 mm long; achene subterete, 0.75 mm long, pilose, hairs rigid, appressed; pappus 4 mm long, hairs very fine, white. *Disc flowers* c. 6; corolla 4.5 mm long; achene and pappus like those of marginal flowers; receptacle flat, afterwards somewhat convex, glabrous, somewhat fimbriate.

Distribution: Malesia, Australia.

a. var. *tenella*

Stem and branches thin, more or less flaccid. Leaves 1.5–6 cm long, 0.3–1.5 cm broad. Involucre 6–7 mm long, phyllaries linear.

Distribution: Malesia, Australia.

NEW GUINEA. East. Western Dist.: Lake Daviumbu, Middle Fly R., 1936, Brass 7837 (BM, BO, L, LAE). — West. Merauke, 1904, Koch s.n. (BO, L); Merauke Subdist., Koembe R., 10 km NE. of Koembe, 1954, van Royen 4836 (L); Vogelkop Pen., Saban, 1941, Anta 265 (A, BO, L).

Collectors' annotations: leaves yellowish green; corolla yellow or white.

Ecological notes: in grasslands, along swamp, in outskirts of *Tristania*-forest. Altitude: 4–10 m.

b. var. *luxurians* Koster, var. nov.

Caulis et rami rigidi. Folia 1.5–10 cm longa, 0.5–2.5 cm lata. Involucrum 8–9 mm longum, squamae lanceolatae.

Type: Robbins 2450 (CANB).

Distribution: New Guinea.

NEW GUINEA. East. Sepik Dist.: Sepik R., Wewak—Angorum area, Palumbai village, 1959, Robbins 2450 (CANB).

Ecological note: in floating grass-swamp.

5. *Blumea saxatilis* Zoll. & Mor., Nat. en Geneesk. Arch. N. I. 2 (1845) 243; Mattfeld, Bot. Jahrb. 62 (1929) 417; Kitamura, Bot. Mag. Tokyo 55 (1941) 344; Randeria, Blumea 10 (1960) 292; Koster in Backer & Bakh., Fl. Java 2 (1965) 389. — *Blumea virens* Martelli, Nuov. Giorn. Bot. Ital. 15 (1883) 291 (*syn. fide* Mattfeld, l.c.).

Herbs, slender, 15–84 cm tall; stem thin, ribbed, sparsely pilose (hairs mixed with glandular ones) or subglabrous, 1 mm thick, often many stems ascending from the base; internodes 2–17 cm long. Leaves sessile, lower ones sometimes subrosulate, oblanceolate and tapering to the base or obovate-oblong, upper ones lanceolate, attenuate- or rounded-truncate at the base, mucronulate, often more or less rounded at the top, remotely dentate (teeth fine, sometimes deltoid and different in length) or subentire, subcoriaceous, more or less densely pubescent (hairs mixed with glandular ones) above, subglabrous or more or less densely pubescent below, 1.5–10 cm long, 0.2–3 cm broad. Inflorescence terminal, loose, thin, 6–10 cm long, composed of one or few heads, branches diffuse, slender, pilose, often long, filiform, with short linear-lanceolate bracts at the base; heads pedunculate, peduncles filiform, pilose, 2–40 mm long, rarely with a small linear bract at the base; involucre 4- or 5-seriate, 6–8 mm long, phyllaries linear-lanceolate, tapering, acute, scarious-margined, green and minutely pubescent in the middle part, outer ones short, 1 mm long. Marginal flowers: corolla 5 mm long; style-arms filiform; achene 1–1.5 mm long, pilose, pappus hairs white, 4 mm long. Disc flowers c. 6; corolla 5 mm long, lobes papillose; style-arms flattened, rounded at the apex, papillose; achene and pappus like those of marginal flowers; receptacle alveolate, glabrous.

Distribution: Thailand, Laos, Vietnam, Malesia (Java, Lesser Sunda Is, Philippines, New Guinea), Australia.

NEW GUINEA. East. Milne Bay Dist.: Sudest I., Joe Landing, 1956, Brass 27779 (L); Cape Vogel Pen., Podago, 1954, Hoogland 4319 (CANB, LAE). — Central Dist.: Rouna, 1935, Carr 12371 (BM, L); Kanosia, 1935, Carr 11310 (BM, L). — Morobe Dist.: Sattelberg, 1937, Clemens 8012a (A); Kajabit Mission, 1939, Clemens 10905 (L), 40733 (A). — W. Highl. Dist.: Mt Hagen Subdist., Pilike Kulu Swamp near Kondo, 8 m. S. of Tambul, 1969, Womersley NGF 43523 (L). — Western Dist.: Wuroi, Oriomo R., 1934, Brass 5832 (GH, NY); Arufi, Wassi Kussa R., 1968, Henty & Katik NGF 38717 (L); Lake Daviumbu, Middle Fly R., common, 1936, Brass 7887 (A, BM, BO, L, LAE). Madang Dist.: Ramu R., 1902, Schlechter 13900 (BO, K). — West. Humboldt Bay, 1875, Beccari s.n. (FI); Merauke, 1907, Koch s.n. (BO, L); Waren, 60 m. S. of Manokwari, very rare, 1940, Kanehira & Hatusima 12957 (BO).

Collectors' annotations: leaves greyish; flowers (pale) yellow, yellowish, white, or pinkish.

Ecological notes: (wet) grasslands, (open) savannah (with *Melaleuca* and *Acacia*); dry *Pteridium* association; coconut grove. Altitude: 0–480 m.

6. *Blumea stenophylla* Merrill, Phil. J. Sc. 29 (1926) 495; Mattfeld, Bot. Jahrb. 62 (1929) 417.

Herbs, stem thin, about 3 mm thick, subglabrous or shortly pubescent, obscurely ribbed; internodes 1–2 cm long. Leaves 0–3 mm petiolate, lanceolate, attenuate at both

ends, very acute at the apex, finely remotely dentate, subcoriaceous, pilose at both sides, minutely glandular above, 3—8 cm long, 0.4—1 cm broad. *Inflorescences* terminal, paniculate, fairly dense, narrow, short, axis densely greyish pilose; heads pedunculate, peduncles filiform, densely pilose, with 1 or 2 linear bracts, densely pilose below, sparsely so above, 3—12 mm long; involucre 4- or 5-seriate, 8—10 mm long, phyllaries linear-lanceolate, tapering and acute, sparsely pilose, scarious, with a green middle line, this thin in the inner ones, outer ones short, 1.5 mm long. *Marginal flowers*: corolla 5.5 mm long; style-arms filiform; achene pubescent, 1.5 mm long, pappus hairs white, 5.5 mm long. *Disc flowers* c. 6; corolla 6 mm long, lobes glandular; style-arms flattened, rounded at the apex, papillose; achene and pappus like those of marginal flowers; receptacle alveolate, glabrous.

Distribution: Philippines, New Guinea.

NEW GUINEA. East. Central Dist.: Budatobara, 1925, *Brass* 756 (BRI, GH). — Western Dist.: Strickland R., 1885, *Bäuerlen s.n.* (MEL); branch of Fly R., 1885, *Bäuerlen* 36 (MEL).

Collectors' annotation: 45—75 cm tall.

Ecological note: river banks; savannah. Altitude: 90 m.

Remarks: Some differences are found between Merrill's description of this species and the New Guinea specimens. From Merrill's description the inflorescences appear to be loose and the involucre only 5—6 mm long, in the New Guinea specimens the inflorescence is fairly dense and the involucre is 8—10 mm long. However, in several Philippine specimens in the Rijksherbarium — by the present author also brought to *Blumea stenophylla* on account of the lanceolate leaves — the inflorescences are fairly dense and the involucre is about 8 mm long. No type specimen was available.

7. *Blumea papuana* S. Moore, Trans. Linn. Soc., Bot 9 (1916) 84; Mattfeld, Bot. Jahrb. 62 (1929) 422; Randeria, *Blumea* 10 (1960) 217.

Tall branched or unbranched herb, stem dark purplish brown when dry, 4—9 mm wide, ribbed, shortly pilose, glandular. *Leaves* 2—10 mm petiolate, elliptic or elliptic-oblong, acute, often tapering at the base, shortly acuminate and acute at the apex, acutely mucronulate-dentate (teeth acuminate), subcoriaceous, shortly appressed-pubescent at both sides, when dry dark coloured above, lighter coloured, minutely glandular below, 2.5—15 cm long, 1—4.5 cm broad, smaller in the inflorescence. *Panicles* terminal, leafy, ample, pyramidal with thyrsoïd, often long (up to 30 cm) branches, 10—50 cm long, 5—45 cm wide; heads solitary or clustered in the upper part of the branches, sessile or on 2—3 mm long peduncles, with a short linear bract; involucre 6- or 7-seriate, 9—10 mm long, phyllaries lanceolate, tapering, acute, appressed-pubescent on the midrib and in the upper part, sparsely ciliate at the margin. *Marginal flowers*: corolla 6 mm long; style-arms fairly short; achene angular and prominently ribbed, appressed-pubescent, 1 mm long, often somewhat curved, pappus 6 mm long, dingy white. *Disc flowers* 5—8; corolla 6 mm long; achene and pappus like those of marginal flowers; receptacle glandular, shortly pilose around the pits.

Distribution: New Guinea.

NEW GUINEA. East. Milne Bay Dist.: Mt Dayman, one specimen, 1953, *Brass* 22871 (A). — Central Dist.: Iolo Creek, Lake Myola, 1964, *Gillison* 338 (L, LAE); Mt Tafa, common, 1933, *Brass* 4931 (A, BO, BRI). — Morobe Dist.: Edie Creek, 1962—1969, *van Royen* NGF 16047 (L), *Streimann* NGF 44454 (L), *Streimann & Kairo* NGF 21069 (L, LAE); Sattelberg, Sambanga, 1937, *Clemens* 7611 (A, L). — W. Highl. Dist.: Tomba, S. slope of Mt Hagen, 1956, *Hoogland & Pullen* 6004 (CANB, L, LAE). — S. Highl. Dist.: Mendi Subdist., Kaguba, 1968, *Vanderberg et al.* NGF 39811 (L). — Madang Dist.: Dumpu, 1964, *Henty*

& Sayers NGF 20525 (L). — West. Bele R., 18 km NE. of Lake Habbema, common, 1938, Brass 11566 (A, L); 9 km NE. of Lake Habbema, 1938, Brass 10558, 10892 (A, L); Treub Mts, 1913, Pulle (leg. Versteeg) 1098 (BO, GH, L, identified by Mattfeld).

Collectors' annotations: erect tall woody (annual) herb, with several stems, 1—2 m tall, whole plant or parts of it purplish red or purplish brown, leaves dark green, glossy above, paler below; phyllaries (brown-) purple; corolla (orange-) yellow or red.

Ecological notes: open places (trails) in wet forest; old landslides; secondary growth; grasslands; roadsides, along streams; on slate. Altitude: 300—2750 m.

Remarks: The type of *Blumea papuana* — Mt Carstensz, 1912—1913, Kloss s.n. (BM) — was not seen by the author. Mattfeld saw a fragment of it (B). However, for comparison a specimen of this endemic and characteristic species, identified by Mattfeld, was available.

8. *Blumea arfakiana* Martelli, Nuov. Giorn. Bot. Ital. 15 (1883) 292; Boerlage, Handl. 2 (1891) 239; Mattfeld, Bot. Jahrb. 62 (1929) 424; Kitamura, Bot. Mag. Tokyo 55 (1941) 344; Randeria, Blumea 10 (1960) 220. — *Blumea aromatica* auct., non DC.: Warburg, Bot. Jahrb. 13 (1891) 446; Lauterbach, Nova Guinea 8, 2 (1910) 336; 8, 4 (1912) 864. — *Blumea balfourii* Hemsl. var. *papuana* S. Moore, Trans. Linn. Soc., Bot. 9 (1916) 84.

Tall herb or shrub, 50—80 cm tall or taller, stem ribbed, densely minutely glandular, sparsely shortly appressed-pubescent, 3—8 mm thick; internodes 2—8 cm long. *Leaves* sessile or nearly so, broadly elliptic, oblong- or obovate-elliptic, spatulate- or obovate-oblong, long-tapering at the base, shortly or fairly long-tapering, acute and mucronulate at the apex, shortly or minutely mucronulate-dentate, chartaceous, scabrid above, sparsely (on the nerves more or less densely) pubescent, densely minutely glandular below, 11—35 cm long, 3—11 cm broad. *Inflorescence* mostly terminal, ample, loose, 20—60 cm long, 10—30 cm wide, sometimes axillary and much smaller, branches pilose, bearing heads in the upper part, with leaf-like narrowly elliptic-oblong or linear bracts at the base; heads pedunculate, peduncles 2—8 mm long, thin, more or less densely pilose, bearing 1—3 minute linear bracts; involucre 8-seriate, 9—10 mm long, squarrose when dry, phyllaries elliptic-lanceolate, glandular, pubescent especially in the upper part, subcoriaceous, rigid, with pale margins, outer short, 2—3 mm long, with fimbriate margins, shortly acuminate, inner long-acuminate. *Marginal flowers:* corolla 8 mm long; style-arms filiform; achene 1.5 mm long, prominently ribbed, fairly long patently whitish pilose, pappus whitish, 6 mm long. *Disc flowers* 2—8; corolla 8 mm long; style-arms short, flattened, rounded at the apex, papillose; achene and pappus like those of marginal flowers; receptacle glabrous.

Distribution: Moluccas, Aru Is, New Guinea, Bismarck Arch., Solomon Is, Palau Is, Samoa Is.

NEW GUINEA. East. Milne Bay Dist.: Normanby I., Lebudowa R., occasional, 1956, Brass 25538 (A, L); Mt Dayman, 1953, Brass 23523 (L, LAE). — Central Dist.: Mt Musgrave, 1889, MacGregor 29 (MEL). — Morobe Dist.: 'Kaiser Wilhelmsland', 1889, Hellwig 490 (BO, K); Finschhafen, 1889, Warburg 21411 (A); Mongi valley, N. of Pindiu, 1964, Hoogland 8854 (L); Burep R., NE. of Lae, 1962, Hartley 10155 (L); Bumbu R., 10 m. from Lae, 1963, Womersley NGF 17608 (BRI, L, LAE); Boana, 1940, Clemens 41792 (A), 1962, Henty NGF 14732 (L); Supot, near Boana, 1962, Henty NGF 14737 (L). — Western Dist.: branch of Fly R., 1889, Bäuerlen 48 (MEL); Palmer R., near junction Black R., 1936, Brass 7306 (BRI, L). — Madang Dist.: foot Mt Hellwig, Puria R., fairly common, 1955, Hoogland 5203 (CANB, L, LAE); slope below Aiome airstrip, 1968, Coode & Katik NGF 32828 (L). — Sepik Dist.: Aitape Subdist., Bliri R., Kaiye, 1961, Darbyshire & Hoogland 8239 (L). — West. Hollandia Dist.: Begowrie R., 40 km SE. of Hollandia, dispersed in small groups, 1910, Gjellerup 238 (BO, L); Cyclops Mts, foothills E. of Koejaboe R., common, 1954,

van Royen 4472 (L, LAE); Idenburg R., near Bernhard Camp, 1939, *Brass* 13068 (A, L); Rouffaer R., 1926, *Docters van Leeuwen* 10072 (BO, L, U); Setakwa R., Canoe Camp, 1912—1913, *Kloss s.n.* (K, type of *Blumea balfourii* Hemsl. var. *papuana* S. Moore); Tor R., 1911, *Gjellerup* 717 (BO). — Southern Dist.: along Lorentz R. (Noord R.), 1907—1912, *von Römer* 167 (BO, L), 301 (L), 958 (L), *Versteeg* 80 (BO, L), 107, (BO, L), 1057 (BO, L, U), 1501 (BO, L, U). — Geelvink Bay Dist.: Napan Subdist., Akama, 1943, *Ijiri & Niimura* 428 (L), 429 (TNS); ibidem, Wati, 1943, *Ijiri & Niimura* 69 (TNS); Japen I., Mentemboe, 1939, *Aet & Idjan* 72 (L). — Vogelkop Pen.: Arfak Mts, Putat, 1872, *Beccari* 843 (FI, type). — Misool I.: near Fakal, scanty, 1948, *Pleyte* 1072 (L).

Collectors' annotations: perennial, herbaceous, half-woody herb, (sub)-shrub, 1.2—3 m tall; stems slightly sticky; leaves yellowish green, dull mid-green, or pale green above, grey-green, paler below; corolla (pale, dull, rusty, white-) yellow, yellowish, light green, greenish; aromatic (with smell of *Artemisia*).

Ecological notes: along (gravelly, rocky) banks of rivers and creeks; fallow gardens; (open places in) forests; *Saccharum* thickets; roadsides. Altitude: 0—900 (—1350) m.

9. *Blumea sylvatica* (Bl.) DC., Prodr. 5 (1836) 447; Clarke, Comp. Ind. (1876) 90; Boerl., Handl. 2 (1891) 239; Merrill, Enum. Phil. 3 (1923) 605; Mattfeld, Bot. Jahrb. 62 (1929) 423; Randeria, *Blumea* 10 (1960) 223; Koster in Backer & Bakh., Fl. Java 2 (1965) 389.

Large erect herb, 75—175 cm tall, stem 5—10 mm thick, tomentose, pubescent, or rarely glabrous; internodes 4—13 cm long. *Leaves* often distant, subsessile or 0.5—1.5 cm petiolate, (often narrowly) elliptic-oblong or obovate-oblong, long (rarely shortly) tapering at the base and at the acute apex, finely remotely dentate (teeth thick, often several ones larger), lowest part entire, chartaceous or submembranaceous, thinly (more densely on the nerves) pubescent on both surfaces, or greyish or pale brownish (hairs erect) tomentose below, minutely glandular on both surfaces, including petiole 6.5—25 cm long, 1.5—9 cm broad, in the inflorescence smaller and narrower (up to 45 cm long and 18 cm broad in specimens from Indonesia). *Heads* in terminal, large, ample, usually leafy panicles up to 45 cm long and 25 cm wide, with a pilose glandular axis bearing leaflike pilose bracts; heads pedunculate, peduncles thin, 3—15 mm long, often with 1 or 2 minute linear bracts; involucre 7—10 mm long, 6-seriate, phyllaries linear-lanceolate, finely acuminate, acute and pilose at the top, uninerved, outer appressed-pubescent, minutely glandular, inner pubescent on the midrib and on the top. *Marginal flowers:* corolla 5.5 mm long, with or without a few long hairs, with scarce minute glandular hairs in the upper part; achene 1 mm long, narrowly oblong, prominently ribbed, whitish pubescent, pappus hairs 6 mm long, dingy or reddish when dry. *Disc flowers* 3—20; corolla 5.5—6 mm long, lobes pilose (hairs few, fairly long), glandular; anthers exerted; achene and pappus like those of marginal flowers; receptacle more or less obviously fimbriate, variously pilose (hairs fairly long or short, many or few) or (sub)glabrous.

Distribution: India, Malesia, Solomon Is.

Remarks: This species is very variable as to shape and pubescence of the leaves, pubescence of the receptacle, and number of the disc flowers.

Blumea milnei Seem. was mentioned by Mattfeld (l.c.) to occur in the Bismarck Archipelago. He had the occasion to study the type of this species. The specimens concerned have not been seen by the present author. Although mentioning slight differences, Mattfeld brought two New Guinea specimens (*Janowski* 369, *Versteeg* 1649) to *Blumea milnei*; here they are transferred to *B. sylvatica*. The same applies to *von Römer* 869, considered by Randeria (o.c., p. 231) to belong to *B. milnei*.

B. milnei seems to be much allied to *B. sylvatica* and differs, according to the description

and the figure of Seem., Fl. Vitiens. (1865—1868), 141, t. 27, by the elliptic or obovate broader leaves and the subsessile heads, glomerate in the upper part of the branches.

a. var. *sylvatica* — *Conyza sylvatica* Bl., Bijdr. (1826) 898; Miq., Fl. Ind. Bat. 2 (1856) 50. — *Conyza sessilifolia* Bl., o.c., 897. — *Blumea sessilifolia* (Bl.) DC., Prodr. 5 (1836) 447. — *Blumea macrophylla* (Bl.) DC. var. *sylvatica* (Bl.) Koster, Blumea 4 (1941) 488.

Upper leaves thinly pubescent below, more densely so on the nerves; disc flowers 3—8 in a head.

Distribution: throughout Malesia, Solomon Is.

NEW GUINEA. East. Bougainville Dist.: Buin Subdist., Tonolei Harbour, 1969, Coode et al. NGF 40418 (L). — Milne Bay Dist.: Mt Dayman, 1953, Brass 23331 (A, L, LAE). — Northern Dist.: Mt Gaugun, 1959, Crutwell 1109 (K). — Central Dist.: Boridi, 1935, Carr s.n. (BM). — Morobe Dist.: Mt Sarawaket, 1937, Clemens 5678 (A). — E. Highl. Dist.: Mt Wilhelm, 1960—1968, van Balgooy 691 (L), Borgmann 202 (L), Philipson 3410 (L). — W. Highl. Dist.: Kubor Ra., S. of Minj, 1963, Pullen 5371 (L); Baiyer—Jimmy Divide, Dagarunga Ridge, 1968, Henty & Streimann NGF 38867 (L). — S. Highl. Dist.: Mt Giluwe, above Klareg, 1961, Schodde 1973 (L); Mendi Subdist., Mendi Rd, 1968, Vandenberg et al. NGF 39736 (L); Ibiwara, Tari Gap, 1966, Gillison NGF 25163 (L, LAE); Wasemi, Lake Kutubu, 1961, Schodde 2308 (L). — Madang Dist.: Finisterre Mts, between Sewe and Mt Abilala, 1964, Pullen 6053 (L); ibidem, Sewe, 1964, Sayers NGF 21385 (BM, L). — Sepik Dist.: Telefomin Subdist., Oksapmin, 1968, Henty et al. NGF 41733 (L). — West. Mt Helliwig, summit, 1909, von Römer 869 (L, det. Lauterbach: *B. milnei* Seem.); Noord R., Resi Mts, 1907, Versteeg 1649 (BO, L, U, det. Lauterbach: *B. milnei* Seem.); S. New Guinea, 1909, von Römer 983 (L, det. Randeria: *B. bicolor* Merr.); S. and SW. New Guinea, 1828, Zippelius s.n. (L, det. Randeria: *B. korthalsiana* (Miq.) Boerl.); Geelvink Bay Dist., Jabi Mts, Wappe, 1913, Janowsky 369 (BO).

Collectors' annotations: erect simple herb, (small) shrub, 1.2—4 m tall; branches of inflorescence angled up; leaves (dull) dark green above, light green below, or mid grey-green on both sides, aromatic, with a slight mint- or *Artemisia*-like smell when crushed; flowers (pale) yellow, creamy, green, greenish brown, yellowish green, or yellowish cream.

Ecological notes: lowland to montane forests or forest edges; along streams; bog grasslands; abandoned gardens; on muddy soil. Altitude: 240—3000 m.

Remark: The types of *Conyza sylvatica* Bl. and *Conyza sessilifolia* Bl., both in the Rijksherbarium, Leiden, have been studied by the author.

b. var. *macrophylla* (Bl.) Randeria, Blumea 10 (1960) 228; Koster in Backer en Bakh., Fl. Java 2 (1965) 389. — *Conyza macrophylla* Bl., Bijdr. (1826) 896; Miq., Fl. Ind. Bat. 2 (1856) 53. — *Blumea macrophylla* (Bl.) DC., Prodr. 5 (1836) 446; Clarke, Comp. Ind. (1876) 88; Boerl., Handl. 2 (1891) 238; Koster, Blumea 4 (1941) 485. — *Conyza ternatensis* Miq., o.c., 49. — *Blumea ternatensis* (Miq.) Boerl., o.c., 239.

Upper leaves densely greyish tomentose below; disc flowers 3—8 in a head.

Distribution: India (Pegu), Malesia (Java, Lesser Sunda Is, Celebes, Moluccas, New Guinea).

NEW GUINEA. East. Morobe Dist.: Bulolo, 1950, Fryar 4030 (A, CANB, LAE); Sattelberg, 1935, Clemens 946 (L), 1936, Clemens 3019 (Z). — E. Highl. Dist.: Goroka Subdist., Chimbu Divide, Daulo Rd Camp, 1954, Womersley et al. NGF 6084 (LAE). — W. Highl. Dist.: Nondugl, 1951, Gyldenstolpe s.n. (S); Lagaip R., Kepilam, 1960, Hoogland & Schodde 7357 (CANB, this specimen is slightly different by the leaves which are shortly attenuate to the base). — West. Hollandia Dist.: Doorman R., 1920, Lam 1294 (BO); Baliem R., 1938, Brass 11656 (A, L, identified as *B. arfakiana* Martelli by Randeria, o.c., 221). — Vogelkop Pen.: Aifak R., Surerem, 1961, van Royen & Sleumer 6743 (L).

Collectors' annotations: erect herb or subshrub, single-stemmed or bushy, 1—3.5 m tall; leaves light green above, light grey below; flowers (greenish) yellow.

Ecological notes: gravelly or sandy banks of streams in forest or in grassland; secondary growth; gardens. Altitude: 200—2400 m.

Remarks: The types of *Conyza macrophylla* Bl. and *Conyza ternatensis* Miq., both in the Rijksherbarium, Leiden, have been studied by the author. Randeria considers the acuminate phyllaries and the glabrous receptacle in this variety to be good characters to distinguish it from var. *sylvatica*. The present author found the phyllaries of both varieties to be acuminate and acute, whereas the receptacle can be glabrous as well as pilose in both varieties. Blume mentioned in his description of *Conyza macrophylla* the underside of the leaves to be greyish tomentose.

c. var. pachycephala (Koster) Koster, *nov. comb. et stat.* — *Blumea pachycephala* Koster, *Blumea* 4 (1941) 487, f. 3; Randeria, *Blumea* 10 (1960) 221; Koster in Backer & Bakh., *Fl. Java* 2 (1965) 388.

Upper leaves thinly pubescent below, more densely so on the nerves; disc flowers 10—20 in a head.

Distribution: Java, New Guinea.

NEW GUINEA. West. Hollandia Dist.: Bele R., 18 km NE. of Lake Habbema, common, 1938, *Brass* 11565 (A, L). — Wissel Lake Region: near bivak Kebon, 1939, *Eyma* 5320 (A, BO, BRI, L); Bogesiga—Araboe bivak, 1939, *Eyma* 5399 (BO). — Vogelkop Pen.: Arfak Mts, Mt Lehuma, 1928, *Mayr* 127 (BO).

Collectors' annotations: woody annual, up to 2 m tall; flowers yellow.

Ecological notes: in grassy regrowth of old garden. Altitude: 2200 m.

10. *Blumea lacera* (Burm. f.) DC. in Wight, *Contr. Bot. Ind.* (1834) 14; *Prodr.* 5 (1836) 436; Clarke, *Comp. Ind.* (1876) 76; Hook. f., *Fl. Br. Ind.* 3 (1881) 263; Boerl., *Handl.* 2 (1891) 238; White, *Proc. R. Soc. Qld* 34 (1922) 60; Ridley, *Fl. Mal. Pen.* 2 (1923) 193; Merrill, *Enum. Phil.* 3 (1923) 602; Gagnepain, *Fl. Gén. I.-C.* 3 (1924) 539; Mattfeld, *Bot. Jahrb.* 62 (1929) 420; Randeria, *Blumea* 10 (1960) 264; Koster in Backer & Bakh., *Fl. Java* 2 (1965) 390; Hu, *Quart. J. Taiwan Mus.* 18 (1965) 325. — *Conyza lacera* Burm. f., *Fl. Ind.* (1768) 180, t. 59 f. 1; Miq., *Fl. Ind. Bat.* 2 (1856) 42. — *Blumea lactucaefolia* DC., *Prodr.* 5 (1836) 435; Hook. f., *o.c.* 672; Boerl., *l.c.* — *Blumea runcinata* DC., *Prodr.* 5 (1836) 438; Miq., *o.c.* 46; Clarke, *o.c.* 78, Koster, *Blumea* 6 (1948) 265.

Erect herb, 20—100 cm tall, stem often simple but sometimes much branched, ribbed, sparsely villous all over or densely so in the upper part or subglabrous, minutely glandular, 3—7 mm thick; internodes 2—7 cm long. *Leaves* sessile or subpetiolate, shortly acuminate, acute or sometimes nearly rounded at the apex, coarsely or finely dentate-serrate or dentate (teeth often much different in size), chartaceous or submembranous, minutely glandular on both surfaces, sparsely or densely whitish villous, somewhat scabrid above, more or less densely whitish villous below, higher ones elliptic- or spatulate-oblong or elliptic, truncate at the base, lower ones obovate-oblong, shortly or long-tapering at the base, or lyrate, often runcinate, sometimes subrosulate at the base; leaves 2—21 cm long, 0.5—13.5 cm broad, upper ones smaller. *Panicles* terminal or axillary, thin, elongate, branches often thyrsoid, heads more or less clustered at the apex, axis and branches villous, lowest branches in the axils of small leaves; heads pedunculate, peduncles villous, 2—35 mm long, often with a minute bract; involucre often purple, 4—10 mm long, 5- or 6-seriate, phyllaries whitish or dingy villous, minutely glandular, with dark-coloured middle line, outer oblanceolate, finely acuminate, acute, inner lanceolate-

linear, acuminate, acute, finely serrate in the upper part. *Marginal flowers*: corolla 4—4.5 mm long, slightly differing in length; achene c. 1 mm long, angular, ribbed, somewhat ~~patently~~ pilose, pappus 4—5 mm long, whitish. *Disc flowers* 8—30; corolla 4—5.5 mm long, lobes acute, glandular, often pilose in the upper part; anthers not or hardly exserted; achene and pappus like those of marginal flowers; receptacle slightly convex, fimbriate, glabrous or sparsely or densely whitish pilose.

Distribution: Africa, India, Thailand, Cambodia, Vietnam, China, Japan, Formosa, Malesia, Solomon Is, Marianas, Australia, New Caledonia.

Remark: Several authors have already mentioned the wide variability of *Blumea lacera*; this is evident in the habit, the leaves, the inflorescence, and the pubescence.

a. var. lacera — *Conyza lacera* Burm. f. — *Blumea lacera* var. *burmannii* DC. et var. *commersonii* DC., Prodr. 5 (1836) 436. — *Conyza acrocephala* Miq., Fl. Ind. Bat. 2 (1856) 43.

Upper part of stem, axis and branches of inflorescence more or less densely whitish or tawny villous. Leaves more or less densely whitish villous below, 0.5—5.5 cm broad. Panicles elongate, narrow, heads congested in the upper part of the branches, often glomerate; involucre 7—8 mm long.

Distribution: as the species.

NEW GUINEA. East. without loc., *Lawes s.n.* (MEL); SE. New Guinea, 1885, *Chalmers s.n.* (MEL). — Milne Bay Dist.: Cape Vogel Pen., Menapi, scattered, 1953, *Brass 21763* (A, L, LAE, det. Randeria: *B. hieracifolia* (Don) DC.). — Northern Dist.: Moi Biri Bay, Baiawa, occasional, 1953, *Brass 22165* (A, L). — Central Dist.: Sowehfaja, Wanigela, near Taipo, fairly common, 1954, *Hoogland 4290* (A, BM, CANB, L, LAE); Vanapa R., Urunu, sporadic, 1933, *Brass 4818* (BO, GH); Aroa R., 1885, *Armit 15* (MEL). — Morobe Dist.: Bululo, 1950, *Fryar 3646* (BM, BO, CANB, L, LAE); Baiune, 1959, *Henty NGF 11641* (LAE); Lake Wanum, 1963, *Henty 16664* (CANB, L); Oomsis, foot of Red Hill, 1962, *Womersley NGF 14190* (L); Finschhafen, 1889, *Warburg 21410* (A, det. Mattfeld: *B. hieracifolia*), *Weinland 41* (BO); Kajabit Mission, 1939, *Clemens 10479 bis* (A), *10890* (A), *40701* (MICH); Erap, 1959, *Henty NGF 11591* (L, LAE); Boana, 1940, *Clemens 41773* (MICH). — E. Highl. Dist.: Kainantu Subdist., Gualga R., Wonerara Patrol Post, 1963, *Henty & Carlquist NGF 16515* (L); Goglime, 1960, *Borgmann 418* (L). — W. Highl. Dist.: Nondugl, 1951—1963, *Gyldenstolpe s.n.* (L, S), *Millar & van Royen NGF 18546* (L); Kubor Ra., Nona—Minj Divide, 1963, *Vink 16337* (L); KOMPIAI, Jimi, *Street & Manner 111* (LAE); Koinambe, Jimi, *Street & Manner s.n.* (LAE); Mt Hagen Station, 1956, *Hoogland & Pullen 5990* (CANB, L); Kileng hills, between Ogelbeng and Kinjibi, 1957, *Robbins 65* (CANB, L, LAE); Dagarunga Ridge, Baiyer—Jimi Divide, 1968, *Henty & Streimann NGF 38876* (L); Sirunki, between Kaipare and Putidi cliff, 1962, *Walker 579* (L). — S. Highl. Dist.: between Kendakl and Yombi, 6 m. N. of Ialibu Patrol Post, 1961, *Pullen 2733* (CANB); Tari Subdist., Ibiwara, rather common, 1966, *Kalkman 4659* (L); pass between Mt Ne and Mt Kerewa, scattered, 1966, *Vink 17148* (L). — Western Dist.: Daru I., sporadic, 1936, *Brass 6351* (A, BM, BO, L, LAE). — Madang Dist.: Konstantinhafen, 1887, *Hollrung s.n.* (BO); Ramu R., Bembi, fairly common, 1955, *Hoogland 5114* (A, BM, CANB, L, LAE); Dumpu, 1964, *Henty & Sayers NGF 20524* (L). — West. Hollandia Dist.: Cyclops Mts, near Natar, 1938, *Meyer-Drees 92* (BO, L); Baliem R., common, 1938, *Brass 11658* (A, L); ibidem, Wiligimaan, rather common, 1961, *Versteegh BW 10490* (L); ibidem, Wellesey, 1966, *Kostermans & Soegeng 575* (L). — Southern Dist.: Merauke, 1904, *Koch s.n.* (BO, L, det. Lauterbach: *B. hieracifolia*); Mopak, near Merauke, *McKee 1758* (L). — Vogelkop Pen.: Arfak Mts, Angi Gita Lake, 1948, *Kostermans 2474* (BO); Kebar Valley, Andjai, 1954, *van Royen 3947* (L).

Collectors' annotations: 1.2—2 m tall; aromatic, with a strong *Artemisia*-odour; stem (dark) purple or red; lower side of leaves purple; involucre dark red or purple at the apex; corolla (light, bright, reddish) yellow (and purple), later purple; anthers yellow, yellowish brown; style (bright) yellow, of disc flowers later white with purple.

Ecological notes: dry to swampy grasslands, savannah woodland; along streams; gardens; on clay, sandy soil, rocky soil, granite rocks. Altitude: 1—2905 m.

Remarks: Judging from Wight, Ic. Pl. Ind. Or. 3 (1846) t. 1099, *Blumea hieracifolia* (D. Don) DC. in Wight, Contr. Bot. Ind. (1834) 15; Prodr. 5 (1836) 442, would not be different from *Blumea lacera* var. *lacera*. Also, specimens identified by Warburg, Bot. Jahrb. 13 (1891) 445, Lauterbach, Fl. Deutsch. Schützgeb. Südsee (1901) 598, Mattfeld, Bot. Jahrb. 62 (1929) 419, Randeria, *Blumea* 10 (1960) 246, and Koster in Backer & Bakh., Fl. Java 2 (1965) 390 as *Blumea hieracifolia* are considered by the present author to belong to *Blumea lacera* var. *lacera*.

In her key to the species of *Blumea*, Randeria (o.c., p. 207) points out that the outer phyllaries should be linear and tapering in *B. lacera*, whereas they should be oblong-lanceolate and acute in *B. hieracifolia*. In his Prodomus, De Candolle described the phyllaries of both species as linear and acuminate. He states the number of disc flowers to be 5 in *B. hieracifolia* and about 20 in *B. lacera*. The present author has found that number to be highly variable in *B. lacera*: 8—20.

White, Proc. R. Soc. Qld 34 (1922) 60, also mentions *B. hieracifolia* from New Guinea (Yule I.).

b. var. blumei DC., Prodr. 5 (1836) 436. — *Conyza javanica* Bl., Bijdr. (1826) 897. — *Blumea javanica* (Bl.) Zoll., Flora 30 (1847) 531. — *Blumea lacera* (Burm. f.) DC. var. *javanica* (Bl.) Koster, *Blumea* 4 (1941) 488. — *Conyza laciniata* Roxb., Fl. Ind. (1832) 601. — *Blumea laciniata* (Roxb.) DC., Prodr. 5 (1836) 436; Hook. f., Fl. Br. Ind. 3 (1881) 264; Boerl., Handl. 2 (1891) 238; Warburg, Bot. Jahrb. 13 (1891) 445; Lauterbach, Nova Guinea 8 (1910) 336; Merrill, Enum. Phil. 3 (1923) 602; Gagnepain, Fl. Gén. I.-C. 3 (1924) 532; Randeria, *Blumea* 10 (1960) 258; Koster in Backer & Bakh., Fl. Java 2 (1965) 388. — *Blumea cichoriifolia* DC. ex Decaisne, Nouv. Ann. Mus. Hist. Nat. Paris 3 (1834) 410; DC., Prodr. 5 (1836) 437; Hook. f., Fl. Br. Ind. 3 (1881) 672. — *Conyza cichoriifolia* Miq., Fl. Ind. Bat. 2 (1856) 47. — *Blumea sinapifolia* Gagnepain, Bull. Soc. Bot. Fr. 68 (1921) 43; Fl. Gén. I.-C. 3 (1924) 536; Mattfeld, Bot. Jahrb. 62 (1929) 418 (with syn. *B. lactucaefolia* Martelli, Nuov. Gior. Bot. Ital. 15, 1883, 290).

Upper part of stem sparsely villous. Leaves sparsely villous or shortly pilose on both surfaces, 0.5—13.5 cm broad. Panicles loose, sometimes ample; involucre 5—8 mm long.

Distribution: Africa, India, Thailand, Cambodia, Vietnam, China, Malesia, Solomon Is, Marianas, Australia, New Caledonia.

NEW GUINEA. East. New Britain: 1885, Parkinson 14 (MEL); Bismarck Arch., 1889, Warburg 21417 (A). — Milne Bay Dist.: Sudest I., Rambuso, 1953, Brass 28210 (A, L, LAE); South Cape, 1877, Chalmers s.n. (MEL); Cape Vogel Pen., Menapi, occasional, 1953, Brass 22044 (A, L, LAE). — Northern Dist.: Kwagira R., Peria Creek, one plant, 1953, Brass 24288 (A, L). — Morobe Dist.: 4 m. S. of Langemak Bay near Finschhafen, 1945, Sawyer 102, 105, 183 (A); vicinity Finschhafen, 1945, Sawyer 279 (L); Adler (=Busu) R., 1890, Lauterbach 672 (L); Abunaka Plantation near Lae, 1967, Henty NGF 29166 (L); Mt Sarawaket, 1937, Clemens 5679 (A); Kajabit Mission, 1939, Clemens s.n., 40643 (A.). — West. Hollandia Dist.: Arso R., upper Tami R., 1910, Gjellerup 17 (BO, L); Rouffaer R., 1926, Docters van Leeuwen 9748 (BO, det. Mattfeld: *B. sinapifolia*); Nassau Ra., 1926, Docters van Leeuwen 10600 (BO, L, det. Mattfeld: *B. sinapifolia*). — Southern Dist.: Lorentz R., near Maukeba, 1912, Pulle 258 (BO, det. Mattfeld: *B. sinapifolia*); Alkmaar, 1907, Versteeg 1499 (BO, L). — Vogelkop Pen.: Arfak Mts, Anggi Lakes, Kofo, 1928, Mayr 228 (BO, det. Mattfeld: *B. sinapifolia*); Wasior, 1928, Mayr 420 (BO, det. Mattfeld: *B. sinapifolia*); Kebar Valley, Andjai, rather common, 1961, van Royen & Sleumer 6758 (L); Sorong, 1872, Beccari 147 (FI). — Without locality: 1896, Lauterbach 860 (K).

Collectors' annotations: 1.2 m tall; young parts of inflorescence strongly pungent-aromatic.

Ecological notes: (marshy, *Imperata*-) grasslands; woodland-grass; sandbank

in creek, open place on riverbank; native gardens, recently cleared land; stone bank, loamy soil. Altitude: 10—1900 m.

Remark: Though small plants of *Blumea lacera* var. *blumei* with thin pubescence and small heads are easily separated from var. *lacera* — which would justify the distinction of two species — numerous specimens out of the great number available were found to be forms transitional between the varieties concerned.

c. var. meraukensis Koster, *Blumea* 4 (1941) 489.

Upper part of stem and leaves sparsely villous. Higher leaves spatulate-oblong, coarsely dentate. Panicles loose, elongate; involucre 4—5 mm long.

Distribution: New Guinea.

NEW GUINEA. West. Merauke, 1904, *Koch s.n.* (BO, L); *ibidem*, 1907, *Versteeg 1844* (BO, L).

Collectors' annotations: Involucre reddish brown; corolla white or yellow.

Ecological notes: in grassy plain, in *Imperata*-fields.

d. var. subdivaricata Koster, *nov. var.*

Pars superior caulis dense villosa. Folia firma, subtus dense vel sparse villosa. Paniculae subdivaricatae, capitula congesta in apice ramorum elongatorum, usque ad 30 cm longorum; involucrem 8—10 cm longum.

Type: *Hoogland & Schodde 7450* (L).

Distribution: New Guinea.

NEW GUINEA. East. Morobe Dist.: Wantoat, 1940, *Clemens 41082* (A). — W. Highl. Dist.: Laiagam Subdist., Yobobos grassland area, source of Lagaip R., 1960, *Hoogland & Schodde 7450* (L, type); Lake Iviva, abundant, 1965, *Flenley ANU 2499* (CANB, L). — S. Highlands Dist.: Mt Giluwe, above Klareg, 1961, *Schodde 2083* (L).

Collectors' annotations: 0.8—1.5 m tall; corolla yellow.

Ecological notes: bog-grasslands, *Mischanthus*-grasslands; low shrubbery. Altitude: 2460—2640 m.

Remark: The habit of this variety is different from most specimens of var. *lacera* to which variety it is nearest. However, there are specimens, brought to var. *lacera* here, with branched inflorescences which only differ by the shorter branches of the panicles.

DUBIOUS RECORDS

The following taxa have been reported for New Guinea, but they have not been incorporated as the specimens concerned were either too scanty or destroyed or lost.

***Blumea balsamifera* (L.) DC. var. macrocephala** Kitamura, *Bot. Mag. Tokyo* 55 (1941) 344; was described from: Waren, 1940, *Kanehira & Hatusima 13210*.

***Blumea bicolor* Merrill** was reported for New Guinea by Randeria, *Blumea* 10 (1960) 231. This was based on *von Römer 983*, a fairly fragmentary specimen brought to *B. sylvatica* var. *sylvatica* by the present author, though its leaves are somewhat different by a shortly acuminate apex.

Blumea subalpina Lauterbach, Fedde Repert. 13 (1915) 241; was described from: Finisterre Ra., Mt. Bolan, 1912, *Keysser* 310, 2200—3000 m alt. Mattfeld saw the type and reports in Bot. Jahrb. 62 (1929) 422 that the inflorescences were too young to recognize the species well.

Blumea vanoverberghii Merrill was mentioned by Mattfeld, Bot. Jahrb. 62 (1929) 420, to occur in New Guinea.

Blumea vestita Kitamura, Bot. Mag. Tokyo 55 (1941) 345, was described from the Arfak Mts, Anggi Lakes, near Lake Giji, fringing forest along Iray R., 1940, *Kanehira & Hatusima* 13893, 1900 m alt.

6. HELENIEAE

Hoffmann, E. & P., Nat. Pfl. Fam. 4, 5 (1894) 251.

Leaves alternate or opposite, often pinnatifid, sometimes simple, sometimes glandular. *Heads* homogamous or heterogamous. *Marginal flowers* female, mostly fertile; corolla mostly ligulate, rarely shortly tubular, bilabiate, or wanting. *Disc flowers* bisexual, mostly fertile, sometimes interior ones or all sterile; corolla tubular, 4- or 5-dentate; style two-armed; pappus setaceous, or consisting of scales, or wanting; receptacle naked or sometimes pilose.

1. TAGETES

L., Spec. Pl. (1753) 887; Benth. & Hook. f., Gen. Pl. 2 (1876) 411; Hoffmann, E. & P., Nat. Pfl. Fam. 4, 5 (1894) 265.

Herbs, erect, annual or perennial, strongly smelling when bruised. *Leaves* alternate or opposite, dentate-serrate, with translucent glands. *Heads* solitary or corymbose, terminal, pedunculate, radiate; involucre cylindric or campanulate; phyllaries uni-seriate, dentate at the apex, connate by their margins, with translucent yellow or orange glands. *Marginal flowers* uni-seriate; corolla ligulate, with a rather long tube and an obovate ligule; style-arms filiform, subobtusate or subacute, glabrous. *Disc flowers* numerous; corolla infundibuliform-tubular, with 5 acute teeth, pubescent at the margins; anthers shortly sagittate at the base, acute at the apex; style-arms rather long, subacute, pilose at the apex; achenes linear, compressed-angular, black with a pale base, pappus consisting of 3—10 membranous, linear, very unequal apically ciliate scales; receptacle convex or flat, naked or sometimes with short bristles.

Distribution: 80 species in C. and S. America, 1 in N. America, 1 in tropical Africa.

1. Tagetes minuta L., Spec. Pl. (1753) 887; Cabrera, Fl. Buenos Aires, Col. Cient. I.N.T.A. (1963) 250, f. 75.

Herbs, 18—65 cm tall, often much branched, mostly in the upper part, sometimes in the lower part, stem ribbed, glabrous, 1—12 mm thick; internodes 2—8 cm long. *Leaves* mostly alternate, some opposite, sessile, with a broadened base appressed to the stem, elliptic, pinnatifid, 3—19 cm long, 1—8.5 cm broad, segments linear-oblong, acute at the top, dentate, glabrous on both sides, with few dark glands at the lower side near the margin, 2—6.5 cm long, 0.3—1 cm broad, lowest segments filiform, often fringed. *Heads* numerous, in small dense terminal corymbs, 1—5 mm pedunculate;

involucre narrowly cylindric, 10—12 mm long, 1.5—2.5 mm thick; phyllaries 4, glabrous, with linear oleiferous dark glands. *Marginal flowers* 2 or 3; corolla 2- or 3-lobed at the top (lobes obtuse), 5—6 mm long, tube shortly pilose; achene linear-fusiform, sparsely pilose (hairs appressed), 7—8 mm long, 1—1.5 mm broad, pappus consisting of 2 lanceolate scales (1.5—3 mm long) and 3 much shorter ones. *Disc flowers* 3 or 4; corolla 4—4.5 mm long, tube shortly pilose; achene and pappus like those of marginal flowers; receptacle minute, somewhat convex, naked.

Distribution: tropical America, introduced in S. Europe, Africa, New Guinea, Australia.

NEW GUINEA. **E a s t.** Central Dist.: Goilala Subdist., between Kuputivava and Omoretu, 1964, *Hartley 13038* (L); Isuarana, 1936, *Carr 15935* (BM, CANB, L). — **E. Highl. Dist.:** Goroka Subdist., Finentegu, a few specimens, 1956, *Hoogland & Pullen 5272* (BM, LAE); Mt Wilhelm, 1957—1960, *Borgmann 283* (L), *Brass 30647* (L, NY), *Pullen 360* (LAE). — **W. Highl. Dist.:** near Wabag, Tsark valley, S. of Tel'ia R., 1965, *Flenley ANU 2711* (L).

Collectors' annotations: aromatic, maladorous, 1.2—1.5 m tall; corolla of marginal flowers pale yellow, of disc flowers yellow. *Uses:* planted as a rat deterrent.

Ecological notes: weed in gardens, clearings in forest, open places, along streams and tracks; sandy or rocky soil. Altitude: 1080—2650 m.